

*November 1939*

# TECHNOLOGY REVIEW

Title Reg. in U. S. Pat. Office





# technology review

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*November 1939*

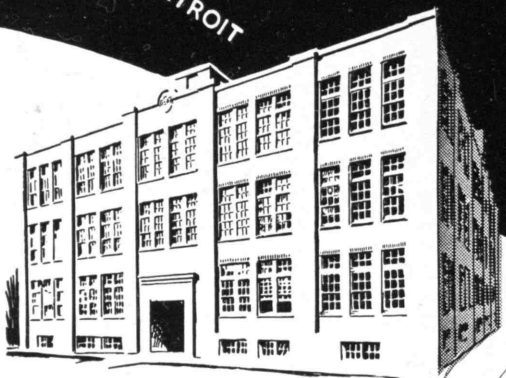
# TECHNOLOGY REVIEW

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DETROIT



# NORTON SERVICE

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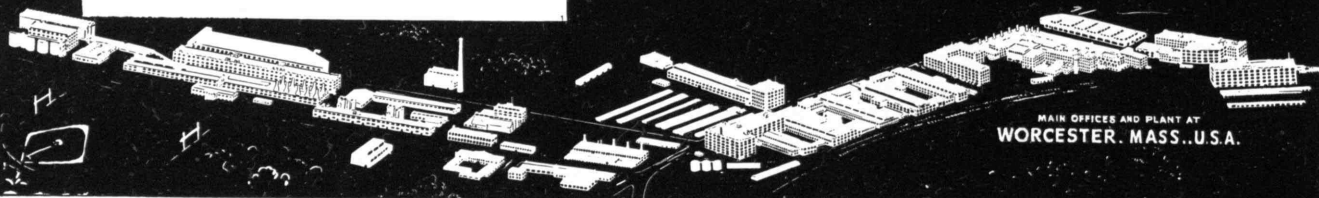
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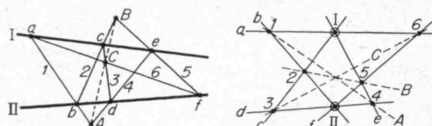


## Just for Fun!

# A CHALLENGE

### TO YOUR INGENUITY

IN plane geometry, the words "straight line" and "point" may often be interchanged without invalidating a proposition. A substitution in Pappus' theorem (below) demonstrates this amazing "principle of duality."



Select any 3 points  $a, c, e$  on line I (see figure at left) and any 3 points  $b, d, f$  on line II. Join  $a, b; b, c; c, d; d, e; e, f; a$  with lines 1, 2, 3, 4, 5, 6 respectively. Join lines [extended] 1, 4; 2, 5; 3, 6 with points  $A, B, C$  respectively.  $A, B, C$  will then lie on a [straight] line! Interchange "line" and "point," and this still works! Why?

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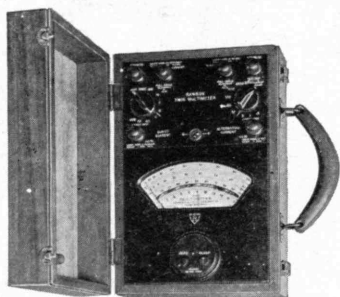
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## THE TABULAR VIEW

IT is inevitable that war anywhere in the world should be reflected and echoed throughout a civilization as complex and interrelated as that of the Twentieth Century. In few departments of man's activities may its effects be expected to be more constant and conspicuous than in science; hence The Review will, of necessity, from time to time report results of martial developments — the few contributions and the many disruptions which war must mean to scientific progress and to the social evolution which relies upon it. In this first issue of Volume 42, KARL T. COMPTON, President of the Institute, lays stress (page 17) upon the road away from war which science offers, and emphasizes the economic gain that would result should nations devote to research into necessities even a small part of the treasure destined for wartime disbursement. From Dr. Compton's presidential report (page 27) we present thoughtful comment upon the present situation as it bears not only on science through the contradiction of the spirit of inquiry by authoritarian control, but also on the process of education through clarification of responsibilities and imposition of new duties. ¶ ARTHUR M. YORK, '37, who writes of the history of yellow fever (page 20), trained at the Institute to join numerous other Alumni in the fourth estate. His interest in the comparatively little known human side of the history of science led to his study of America's earlier experiences with what has been called the last of the great plagues. ¶ PHILIP M. MORSE, Professor of Physics at Technology and Editorial Associate of The Review, has long been known to readers of the magazine as a skilled expositor of even the most abstruse aspects of present-day nuclear research. His discussion of the building blocks of which the universe is made (page 22) summarizes latest knowledge of the subject and answers many of the puzzling questions with which the unseen particles may plague the nonspecialist reader. As it provides definition and description of these strangely termed strange entities, Dr. Morse's article will prove valuable as well as interesting. ¶ Far less recondite but often fully as mysterious are the operations of analysts who put science to work to unravel crime rather than to untangle the structure of matter. FRANK C. STRATTON, '29, explains (page 24), on the basis of well-rounded experience, the use of science in the routine work of contemporary police laboratories. A graduate of Massachusetts State College, Mr. Stratton did advanced study at Technology and has investigated enzymes for a fruit company both in Boston and in the tropics, conducted endocrine research at a state institution for the insane, as well as served the Boston Police Department for the past five years. ¶ MAURICE HOLLAND, '16, director of the division of engineering and industrial research of the National Research Council, is also executive officer of the Industrial Research Institute sponsored by that organization. His survey of a tour of member laboratories (page 12) thus is written from a background of full knowledge of industry's research needs.





General view in plant of Philip Sievering, Inc., New York City. At left, a close-up of Webster Process Steam Traps in use.

# Tanks and Ovens Heated with 25 p. c. Less Steam

Philip Sievering, Inc., electro-platers and polishers, reduced steam consumption approximately 25 per cent by equipping their heating ovens, plating tanks and drying ovens with Webster Process Steam Traps.

In the Sievering plant, Webster Traps help the high pressure equipment to develop maximum output by insuring prompt and continuous discharge of air and water of condensation.

In discussing the application of Webster Traps to the electro-plating and polishing equipment, Philip Sievering says:

"In May, 1938, we made a trial installation of a Webster Trap on one of our heating ovens. Having been favorably impressed with the results, we

decided to install Webster Traps on all of our plating tanks and drying ovens which are heated by steam. The results so far have more than borne out our earlier impressions.

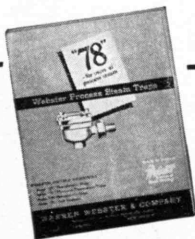
"While it is hard to check the exact savings in dollars and cents, we estimate that it amounts to approximately 25 per cent.

"In addition," Mr. Sievering says, "we have eliminated the fuss and bother of turning on, shutting off and regulating the exhaust valves."

There are 44 Webster Process Steam Traps in use in the Sievering plant.

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Pioneers of the Vacuum System of Steam Heating:: Est. 1888  
Representatives in 65 principal cities :: Darling Bros., Ltd., Montreal, Canada

H. F. MARSHALL '19



If you use steam at process pressures let us send you complete information, including tested application data, on Webster Process Steam Traps. Ask for Bulletin 1200D.

-since 1888  
**Webster**  
Systems of  
Steam Heating

*Now...  
Two Models*

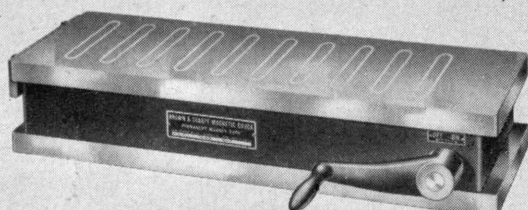
# **ROTARY and RECTANGULAR BROWN & SHARPE MAGNETIC CHUCKS**

**Permanent Magnet Type**

**No Wires—No Heating—No Running Costs**



Ask for Circular — **Brown & Sharpe Mfg. Co.**  
Providence, R. I., U. S. A.



Samson Trade Mark

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**Boston, Mass.**

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Our extra quality, distinguished at a glance by our trade mark, the colored spots. Especially well known as the most durable material for hanging windows, for which use it has been specified by architects for more than forty years.

## **MAIL RETURNS**

### *Is the Motion Seconded?*

FROM JUDSON C. DICKERMAN, '95:

The June Review was of unusual interest to me for various reasons. Raymond's article lifting inspiration to spiritual ideals, Rhodes's somewhat slight but also helpfully concrete treatment of "A Technology of Trade" suggesting facts and ideas that need serious consideration, and especially "The Deadly Guest" article, which brought home to me vividly the inherent danger of some of the devices I have installed in my home to increase comfort (such as sealing my attic roofs with noncombustible insulation, stopping all outward flow of air) or as protection against sneak thieves (inaccessible fasteners on windows) — all these articles had an appeal.

Here is a suggestion: Why not get a series of modest advertisements for The Review from manufacturers of home safety devices, not neglecting the simpler, less expensive kinds. I would like to install a device that would sound an alarm if the temperature in two or three most likely or important places became unduly high. Also I want window latches that can be reached and operated by a child. Fortunately every second-story bedroom in my house has at least one wide window opening out on a porch or extension roof. With sash thrown up, there is ample room to get out without falling. But my full-length screens in summer are hooked in place so tight that they often cannot be unhooked without pliers!

What problems are raised by Holbrook's paper! Anything The Review can do to aid householders to correct such dangerous conditions should be appreciated by many. I intend to show Holbrook's article to our local fire chief in Chevy Chase. . . .

*Chevy Chase, Md.*

### *Endorsement*

FROM CHARLOTTE WINNEMORE, '30:

May I underscore every word of the letter from Albert J. Gracia, '28, "Keep the Laboratories Open," which was published in the July Review? He has very ably called attention to the tendency to do that which we condemn in others, and he has stated well the reasons for maintaining the true scientific attitude.

*Columbus, Ohio*

### *Better Use of Soils*

FROM VLADIMIR NUKUROVICZ:

I was very interested in what your journal told about the barrage at Sukkur in your April issue [page 245]. That great project by itself is of much importance to the future of India, as your contributor so rightly suggested. I cannot tell you, too, how impressive is the spectacle — philosophically considered — of the thousands upon thousands of hands and backs laboring at one time upon the mighty structure, aided and supported in their endeavor by the best that steel and steam and modern scientific technology can bring to their assistance. It is a meeting of the old and the new, to produce a thing which is new but very old as well — the fertility of the land.

But there are other and maybe more important things to come from India. Colonization of the land thus rendered useful by irrigation presents by itself a vast problem and a vaster opportunity. That this colonization will be done by educated youths who have been trained especially to bring the greatest result from both the material with which they work and the energies they themselves supply is a thing to be hoped, and a thing that probably will be seen. However, knowledge of the land itself — all the land of India — remains to be gathered. The groups of soils which make up the arable lands of India, and how these groups of soils are related to the great world groups, must be learned. It is upon such work as this that farseeing ones among the Indian people are even now embarking.

*New York, N. Y.*

### *Noted with Thanks*

FROM ARTHUR F. JOHNSON, '26:

I wish to say that The Review makes me very proud to know that I am an alumnus of M.I.T. My only criticism of it is that there might be more pages of the same material between its covers than at present.

*Big Bell Mine, West Australia*





## **SPECIFYING FOR DEPENDABILITY PLUS**

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**Climax Mo-lyb-den-um Company**  
**500 Fifth Avenue • New York City**

# Living up to the Greatest Name in Rubber



Pliofilm's waterproofness exemplified by its use in raincoats and umbrellas offers new possibilities in packaging popcorn, cereals, drugs and other products requiring absolute moisture protection.

## Pliofilm is revolutionizing packaging...and a dozen other industries

**T**O transparent packaging Goodyear now brings the signal advantage of inherent moisture-proofness—in a new synthetic sheet material of unusual strength and toughness called Pliofilm\*. It is so completely waterproof that raincoats and umbrellas are being made of it—so stoutly durable that many liquid-packed products heretofore packageable only in glass or tin are finding new economy in Pliofilm containers. And it seals with an airtight weld, making it possible to vacuum-pack coffee in inexpensive Pliofilm bags.

These unique properties promise

important savings to many industries. Tests show bread keeps moist and fresh for weeks when sealed in Pliofilm. Hygroscopic chemicals keep tinder-dry in Pliofilm-lined bags that replace metal canisters. Its high tear-resistance gives lasting protection to all fine merchandise from counter wear and soilage, keeps it clean and price-worthy. And in the home Pliofilm finds wide utility in colorful curtains, table covers, lamp shades, garment bags and toilet accessories. Product of a thousand uses, it is one more proof of Goodyear's leadership as the greatest name in rubber.



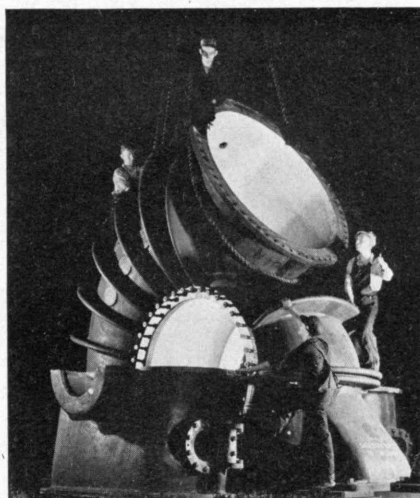
1839 • THE CENTENNIAL OF RUBBER • 1939

*Great beyond all other names in rubber is that of Charles Goodyear—discoverer just a century ago of the process of vulcanization that made rubber usable to mankind. To honor him The Goodyear Tire & Rubber Company was named long after his death; from his lifelong effort to extend rubber's utility it takes inspiration and seeks by serviceability to deserve his name.*

\*Trade-mark of The Goodyear Tire & Rubber Company

# GOOD YEAR





Allis-Chalmers

*Figures in an industrial pantomime — workers dismantling a six-foot sewage pump in preparation for shipment*

# THE TECHNOLOGY REVIEW

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VOL. 42, NO. 1

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*From a photograph by James N. Doolittle*

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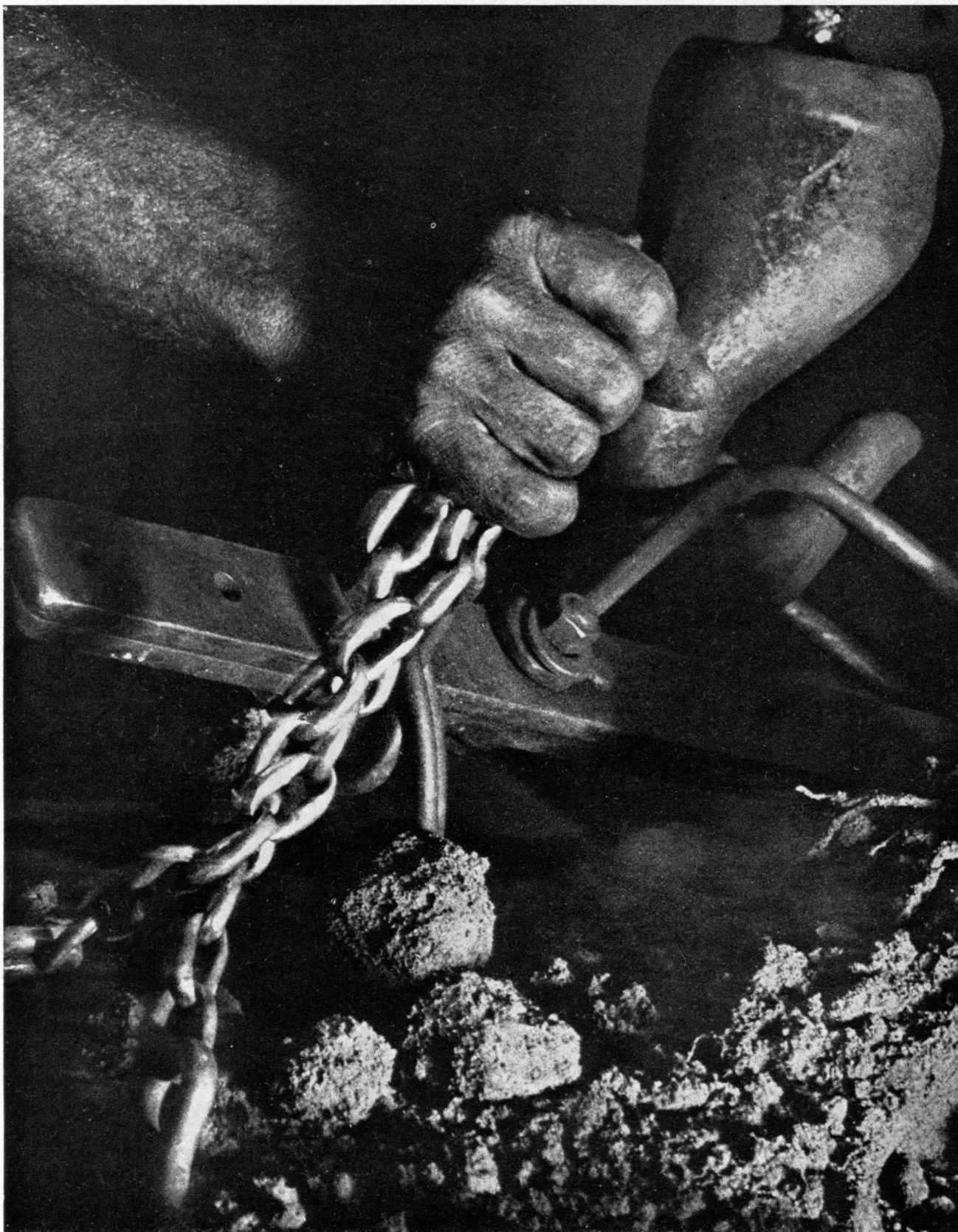
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*Kollar from Black Star*

### **STRENGTH**

*. . . that of steel reaches its best usefulness only as that of man rightly guides it*



# THE TECHNOLOGY REVIEW

Vol. 42, No. 1



November, 1939

## The Trend of Affairs

### *Unnatural Oil from Natural Gas*

**A**NOTHER example of the application of a single curious fact in pure science to far-reaching practical use in modern industry is being revealed currently in the oil industry, particularly in the new fields of the Southwest. The principle of retrograde condensation was known more than a half century ago, but only to a handful of pure scientists who took the phenomenon for what it was worth without even guessing it would ever have any practical connotations. They observed that a liquid in vapor form would, in the presence of an uncondensable gas, condense with an increase in pressure. That was to be expected on the basis of past observations. But, when much greater pressures were imposed on the mixture, the process reversed itself: The liquid vaporized again and went into some sort of union with the gas.

When William N. Lacey of the California Institute of Technology addressed the meeting of the American Petroleum Institute in 1932, he pointed out that modern oil wells were reaching such great depths in the search for new deposits that natural pressures were being reached great enough to cause such a retrograde condensation of oil in the presence of natural gas. The significance of his statement was not immediately to be realized because there were skeptics among the petroleum engineers. But today there are at least sixty oil fields in the Southwest extracting petroleum products from the ground by a method based on just that phenomenon, and it has been concluded that a substantial proportion of our motor fuels in the future will be derived from these new sources.

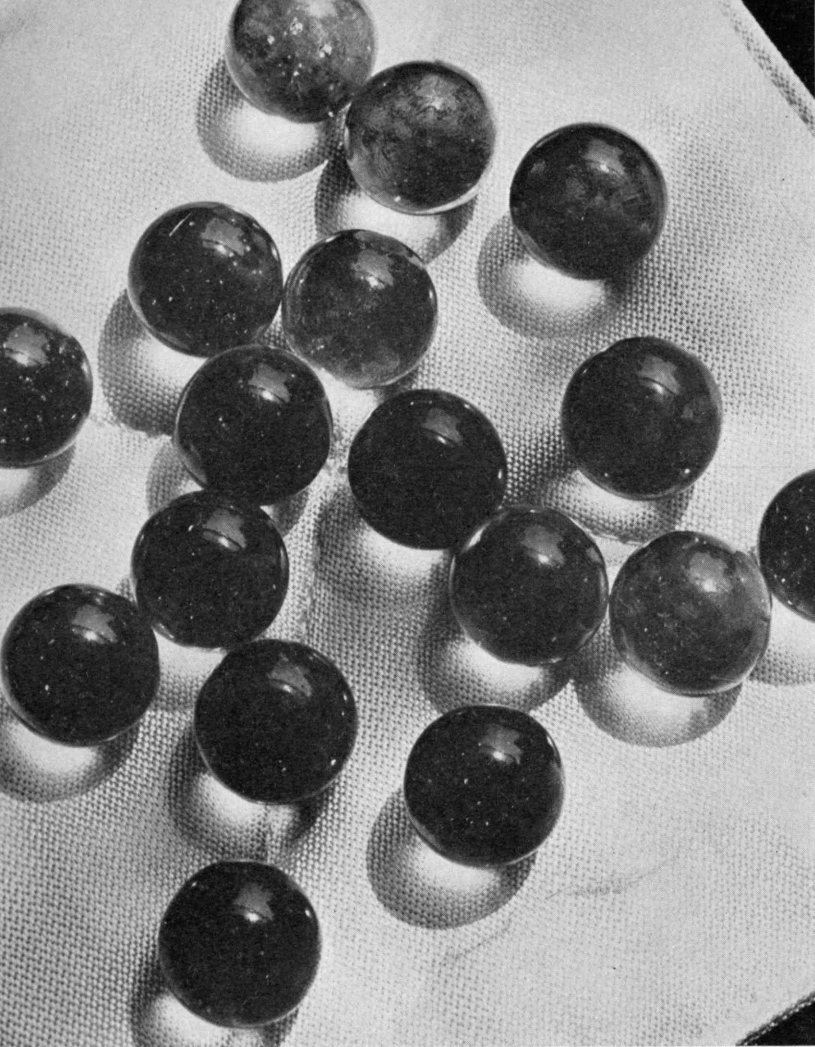
Nearly all of our so-called shallow oil fields, where petroleum existed naturally as a liquid, have been exploited. In these it was customary to find gas under moderate pressure at the cap of the dome of porous rock

in which the oil was found. Such pressures were useful for forcing the oil to the surface, since it was usually only where and how deep in the dome the well was sunk that determined whether oil or gas would be obtained.

But as the petroleum engineers go deeper and deeper in search for oil, they find greater and greater pressures existing naturally in the earth. From wells two miles or more in depth, little or no liquid oil is found. But there is found a gaseous mixture from which large amounts of oil will condense when the pressure has been reduced. Called distillate pools because the oil is found as a vapor, these wells yield one or two gallons of oil per thousand cubic feet of gas. A substantial return can be obtained from their operation because it is estimated that an average well, established at a cost of \$300,000 to \$500,000, can yield a gross return of \$470 to \$1,500 a day over a period of many years. For example, one large field has been operated for four years and still shows little prospect that its resources will soon be exhausted.

However, the process is not all simplicity, because the gas cannot be just released after the oil has been removed from it. What actually happens is this: The mixture comes to the surface at a pressure of about 1,500 pounds per square inch, the pressure is reduced several hundred pounds to allow the oil to condense out. Then the gas is raised to a higher pressure and forced back into the reservoir a short distance from the withdrawal well to drive out more untreated gas. If this return were not made, the pressure of the well would gradually diminish until a point would be reached where the oil would condense in the ground. Then it could never be recovered because the oil occurs in these distillate wells in such relatively small concentration that it would be absorbed by the porous rock instead of collecting in pools.





*Globes of glass like these, converted first into fiber and then into thread, become silky glass cloth like that here shown.*

*Sanders from Black Star*

Incidentally this is only one of the applications of the recycling method and the phenomenon of retrograde condensation. Within the oil refineries themselves, this process has been found a workable method of extracting asphalt, wax, and other fractionations from crude oil. High temperatures which caused decomposition and wastage in the older distillation processes are no longer necessary, and, as a result, a better lubricating oil is obtained. Propane is used here as a solvent which will take on heavier and heavier fractionations as the pressure is raised.

### *Integration by Light*

THE apartment dweller shaving in a bathroom lighted by a window opening on a light shaft finds the angle of his jaw illuminated well or ill according to the shrewdness with which the designer of the building reckoned the light-gathering and light-transmitting capacities of the shaft piercing the building. If the shaver is able to survey and operate on his mirrored physiognomy without turning on electricity to aid him, he owes thanks not only to the architect but also to the components making up the light that gets in the window. These include direct light from the sky above — which depends of course upon the position of the sun — and reflected light from the walls of the shaft — which depends not only upon the position of the sun but also upon the shape of the shaft (though, strangely enough, not upon its size) and upon the surface finish that has been applied

to its walls. Obviously, the light from the sky and sun varies from moment to moment. This fact makes arduous the design problem of calculating in advance how much light may be expected to enter such a window in a building which is still on paper. Essentially, the process of making such calculations is that of integration — the determination of a quantity itself from knowledge of all of its infinitesimal components. Too often, even in apparently simple problems, this becomes a very laborious mathematical task.

Difficulties of this kind appear to provide an assured position of extreme usefulness for the latest addition to Technology's battery of mathematical machines — the cinema integrator so called — which has been put into operation during the past year, after a test period of some months following its construction by Gordon S. Brown, '31, Assistant Professor, with the collaboration of Professor Harold L. Hazen, '24, of the Department of Electrical Engineering, under the general supervision of Vannevar Bush, '16, head of the Carnegie Institution of Washington. The history of this machine and its ancestors is a long one, tracing of which contributes to understanding the integrator itself.

Some fourteen years ago, Professor Norbert Wiener, of the Institute's Department of Mathematics, conceived the idea that radiation, whether in the visible or invisible region, might be used in a machine under proper conditions to reduce greatly the labor required to perform integration. Infrared radiation in amounts proportional to the positive and negative contributions to the integral to be evaluated was measured by thermocouples in the radiation integrator which, developed by King E. Gould, '25, about 1928, was the first embodiment of the idea. During the next few years, Truman S. Gray, '29, now Assistant Professor in the Electrical Engineering Department at the Institute, constructed the photoelectric integrator, which used visible radiation measured by photoelectric cells. These two machines demonstrated the soundness of the basic theory and the possibility of building a practical machine to use it.

The present mechanical thinker, third in the series, resembles the second in that it, too, measures varying quantities of light which represent the variables being evaluated. In the cinema integrator, however, as the name suggests, a motion-picture technique is employed; frames of motion-picture film are masked off in such a way that the remaining portion represents one function, and similar arrangements are made for the second function. Light passed through these transparent areas is directed by mirrors into integrating spheres — bomb-shaped hollow metal globes — and actuates photocells which drive an equalizing mechanism that in turn actuates a recording device. Detailed discussion of the machine is soon to appear in the *Journal* of the Franklin Institute.

The scheme of operation of the cinema integrator is illustrated by the light-shaft problem that has been mentioned. In one film the frames are made to represent the illumination of any given point on the shaft wall produced by an assumed unit brightness at any other part of the wall. Those of the second film give the assumed actual brightness at all points on the wall, the actual brightness being, unfortunately, the unknown func-

tion. The amount of radiation transmitted through a pair of these frames in the cinema integrator is, if the assumed brightness was correct, a measure of the actual brightness of the shaft wall. Thus an answer must be assumed and put on the frames of the second film in order for the actual answer to be found — an enigma described by mathematicians by means of an integral equation. Actually, the problem is solved by a process of successive improvements in which the actual-brightness function that satisfies the integral equation is ferreted out by the machine. This task of ferreting out had been well-nigh hopeless until the speed of the machine allowed the many computations to be made in a rather short time. Thus by a curious coincidence light in the machine casts light upon a problem in light, and the architect may know ahead of time how clearly the future shaver will be able to see his face. The cinema integrator has been employed at the Institute in recent months upon this very problem by Walter R. Hedeman, Jr., '34, who undertook the project as part of his doctorate program.

A machine to perform such work necessarily involves many ingenious mechanisms. The source of the light transmitted through the films, for example, presents special difficulties, for the light must be distributed evenly over the film if accurate results are to be secured. The integrator uses a special lamp consisting of a single fine tungsten wire about a foot long, incased in an evacuated glass tube. Nonuniformities in the tube and the wire made the construction of this lamp especially troublesome. Development of a rugged white coating for the interior of the integrating spheres presented similar special difficulties.

Desire to make research more efficient by freeing it from the great labor involved in applying mathematical analysis to the solution of various problems is the driving force behind this long development. In seeking periodicities in such recurrent phenomena as variations in temperature, rainfall, or river flow to serve as a basis for predictions, analysts may find the machine useful. Such problems as the determination of the rate of replacement necessary to maintain a constant supply of units such as electric light bulbs, or the determination of how a structure such as a water tower will respond to earthquake or explosion shocks, are made easier of attack by the integrator.

### *Ion by Ion*

**E**LECTROPLATING, commonly regarded as a finishing operation concerned with the appearance of cocktail shakers and the weather resistance of golf-club heads, is re-emerging as a primary fabricating technique. Within the past few years methods have been announced for the making of screens, gaskets, sheets, foil, and even radiator cores in the plating bath and directly from scrap or virgin metal.

The idea must be a good one, for it is almost as old as electrodeposition, the art of depositing the metallic ions of a salt solution on a negative pole, or cathode, to form — under conditions that frequently belie the simplicity of the principle — a strong, pure layer of the metal. The *Athenæum* as long ago as 1839, for example, reported thus: "Galvanic Engraving in Relief. — While

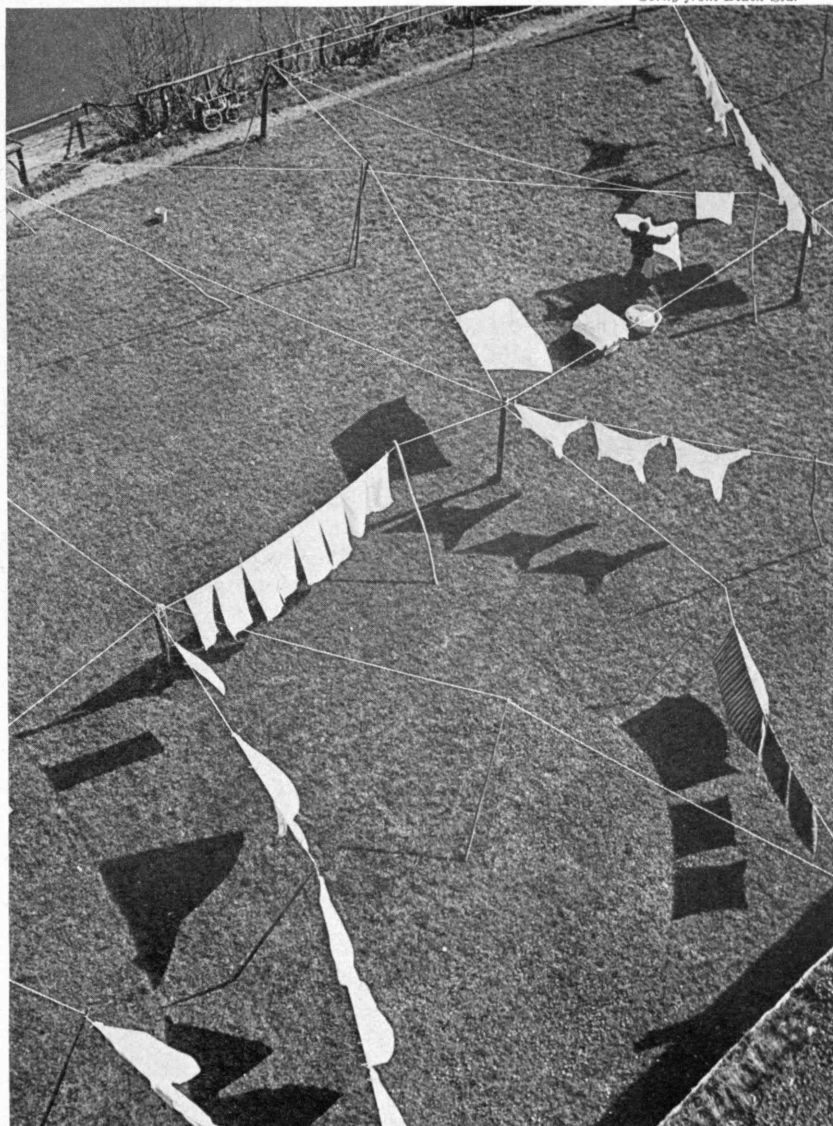
M. Daguerre and Mr. Fox Talbot have been dipping their pencils in the solar spectrum, and astonishing us with their inventions [Nineteenth Century way of saying that they were developing the Daguerreotype], it appears that Professor Jacobi, at St. Petersburg, has also made a discovery which promises to be of little less importance to the arts. He has found a method — if we understand our informant rightly — of converting any line, however fine, engraved on copper, into a relief by galvanic process. The Emperor of Russia has placed at the professor's disposal funds to enable him to complete his discovery."

Although the immediate effect of this elegantly phrased statement was to set off a long debate about who really did invent electrotyping and its associated processes, it is indicative of the stress which the industry during its early days placed on the ability of the plating bath to form accurate reproductions from molds and other complete objects rather than to form mere coatings. Under the guidance of Jacobi the Russians made "colossal statues in electrolytic copper which at the time created profound astonishment and admiration." A French firm produced a statue 29 feet 6 inches high, and a writer of the Eighties mentions the manufacture of copper plate, tubes, and cylinders up to 30 feet in length.

Today, most of the articles being made are of a kind whose cost per pound is high. Representative is the manufacture of filtering, straining, and photoengraving screens ranging in mesh from 25 to 300. The wide

*Domestic Geometry*

*Gorny from Black Star*





engineering applications of screens in the mining, chemical, automotive (there are eight in an automobile), and other industries, make accuracy of mesh frequently a vital consideration. Since the electrolytically formed screens start with the engraving of the desired pattern on a master plate, this factor of accuracy is under close control. The designer is likewise freed from the limitations which weaving imposes on the shape of the holes and on the ratio of open to closed area. Nor are the good physical properties of electrolytic metal a handicap.

In the manufacture of one of the new screens a rubber matrix is prepared from the engraved master plate, is mounted in what is virtually a printing press, is inked, and, on the smooth surface of the metal sheet that serves as a cathode, prints a pattern of dots corresponding to the apertures of the screen which is to be produced. Since the ions driven by the electric current to the cathode will not stick to the inked spots, a layer of metal is slowly built up which, after being stripped from the cathode and trimmed, is a complete screen. Being deposited on a flat surface, the screens lack the "knuckles" of the woven type and are said to wear far better on that account. Gaskets are being formed in a similar manner without stamping or waste. Cathodes cast in the proper shape from an alloy of low melting point are used for the manufacture of radiator cores by plating. After plating has occurred, the cathode and its copper coating are placed in boiling water, the alloy melts and is centrifuged out, and there is left as a result a finished, jointless, copper radiator.

From the same family tree (though by another firm) is a continuous process for making copper sheets. Here the cathode is a slowly revolving drum, most of which is above the plating solution. Copper is deposited at a speed such that as a given area on the drum makes one pass through the electrolyte, the required thickness of sheet (within commercial tolerances) is formed. As the sheet rides up and out of the bath, it is stripped off, trimmed, and is ready for shipment. One reason why almost a decade of work preceded commercial production by this process is indicated by the precautions required to maintain a uniform surface finish on the sheet; the lead covering of the drum (lead was adopted after



*Rooftops of Freiburg, Germany, from a window of its medieval cathedral*

*Bruno Roth*

everything from silver to tantalum had been tried) is continuously ground, polished, and treated with stripping agents. Applications for the product include some curiously unmetallic uses: It is found serving as linings for export packages, as greeting cards, and as bottle labels (with a gummed-paper backing).

Compared with the layers but one or two thousandths of an inch thick which are customarily used in plating for appearance and those about five thousandths thick which are used in plating for corrosion resistance, the deposits needed for some of the shape-making processes are rather heavy. Heavier still are the deposits, mainly nickel, sometimes used in building up worn or mismachined parts, where metal up to 0.2 inch, although commonly far less than that, is laid down ion by ion. Because such processes are carried on at little above room temperature and because, like the pouring of liquid metal into molds,

they are basic forming operations, the appellation of cold casting which not long ago was conferred on them seems overdue as well as highly appropriate.

## Science in Glass Houses

BY MAURICE HOLLAND

**W**HAT is research, in terms of industry?"

"How do the conception and practice of research vary from industry to industry?"

"How may the research experience of one industry be made useful to others?"

*The swift growth, present extent, and future probabilities of the industrial utilization of research in America make answers to these questions obviously important. Witness the fact that American industry already invests annually in research about two hundred million dollars. Processes, products, and profits are tangible and immediate results of this disbursement. Ultimate and abstract consequences are to be found in the answers to such questions as those above. Particular interest, therefore, attaches to the following survey of a discussion of these issues by men charged with the responsibility of directing research for various industries. The opinions here expressed were outcome of a tour of member laboratories conducted in the summer by the*

*Industrial Research Institute, the organization of industrial research officers which is affiliated with the National Research Council. Director of the division of engineering and industrial research of that Council, Mr. Holland serves also as executive officer of the Research Institute.*

**D**ISCUSSION which remains academic because it has little or no basis in fact and observation rarely produces many useful results. When it grows out of firsthand knowledge of the subject attacked, however, discussion may often be expected to open usable new lines of thought, and to produce practical guides to future action. The clinical discussion of similarities and differences in laboratory organization and functional operation which followed the Industrial Research Institute's tour of member laboratories rightly falls into the second class. It was carried on by men to whom industrial research is a primary concern, and a bread-and-butter job. It had as basis their experiences and observations during the tour.

The research laboratories visited were those of organizations differing widely in objective — the Hoover Company, makers of vacuum sweepers; the Jones and Laughlin Steel Corporation; and the Hercules Powder Company. Yet, in the words of one observer: "The thing which struck me particularly on this tour was the essential similarity of the research in three very divergent industries. It seems to me that when research is first established in a company, it tends to be highly applicational in nature and, therefore, apparently very diverse with different industries. But the longer the research department has been established in a company, the more its work comes to be of fundamental character and therefore essentially the same throughout all industries. In the beginning, for example, it might be research in casting methods, materials handling, and distillation equipment which would interest the three industries we have seen. But later in the research histories of such companies, their research departments will be interested in the fundamental properties of the substances they handle — properties which are rooted in fundamental characteristics common to every industry that handles materials. The longer divergent companies have been in research, the more the essential *S* [similarity] factors become evident between their research departments, and the *D* [difference] factors fade into the background. This, I believe, is striking evidence of the essential value of fundamental research in industry."

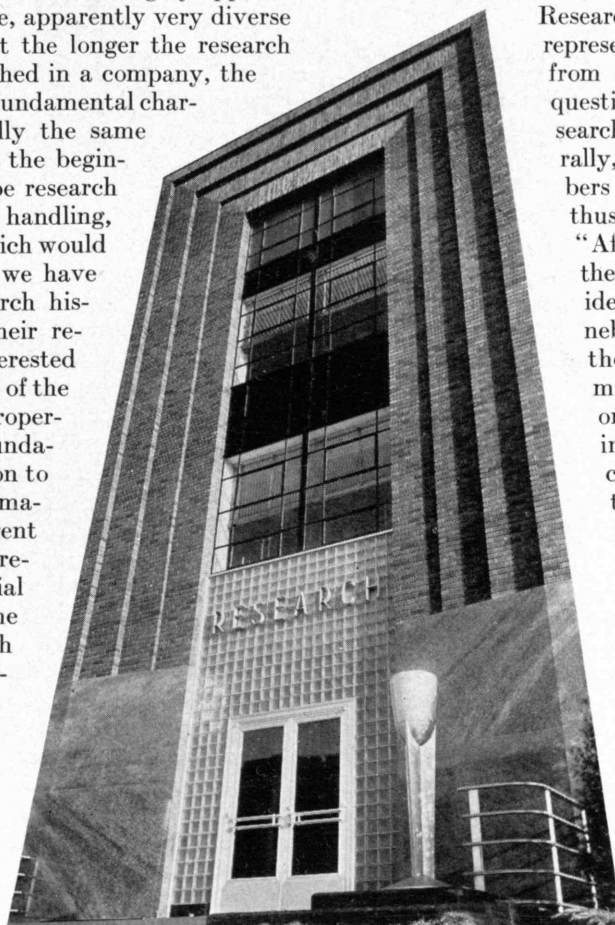
To others of the group, fundamental similarity did not appear quite so sharply defined as to this observer. They felt,

nevertheless, that important correspondences exist, as their statements indicate. Says one man: "The three companies that we visited all have similarities — all have research, sales, production, and finance departments — pure research and applied research. Pure research means long-time research; applied research means more pressure to get things done. We also should look at the dissimilarities. We have to get ideas from all departments. We found that sales department information was quite a factor in the Jones and Laughlin Steel Corporation's research department and in the Hercules research department. All of the companies had contact between the research department and the production department. The question is how can we, as research directors, get the best information from the field."

Partial agreement occurs in this remark by another member of the tour: "An attempt to pick two or three different fields is purely an academic one. I am interested from an *S* and *D* point of view. I am still left with the impression, and have had it from watching electrical research, that research looks different indeed from industry to industry. The *S* factor does predominate more and more. The *D* factor may not be real between the Hercules Company and the other two. On the relation of research to production isn't it true that in chemical companies the research on the product is all done before the product comes out? That other products, like those made by the Hoover Company, are modified even after the research period ends?"

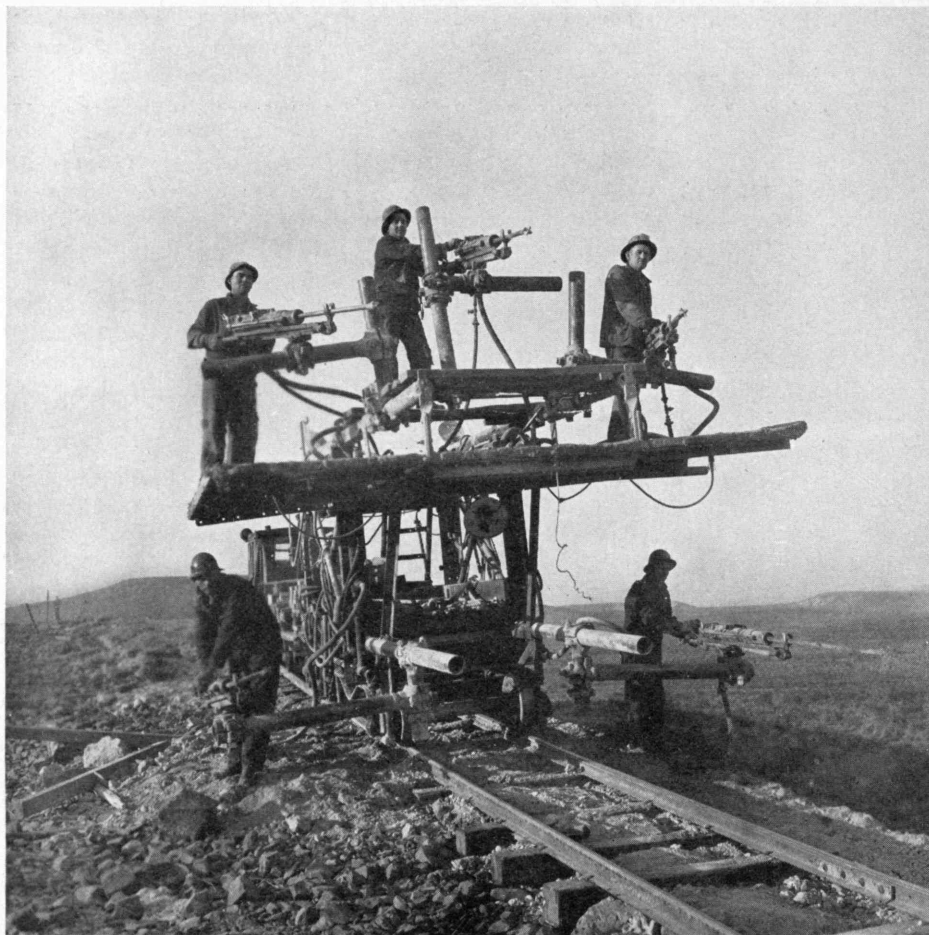
Research programs in industry still represent, in some degree, a departure from usual practice, so that the question of the justification of research remains a vital one. Naturally, this was considered by members of the party. The case was put thus by one research official: "After about three days of seeing these laboratories, I felt various ideas taking shape in a rather nebulous fashion in my mind, and the question arises of just how much doubt we all have whether or not fundamental research in industrial research laboratories can be justified. In all three of the companies we visited, we saw fundamental industrial research an actual fruitful undertaking. A systematic effort to improve a product in a fundamental manner and to develop new products can always be justified if it is properly managed. . . ."

Another reasons from the fundamental similarity of the three research centers to a common source of justification: "I am thoroughly in accord that there is a common thought running through



Abbott Laboratories by Sarra, Inc.  
Entrance façade of a modern industrial research building





*Further armaments of peace: a jumbo drill carriage with five drifter drills, which advanced an average of 26.7 feet daily in driving the 3,925-foot tunnel of the Roza Canal Project at Yakima*

*Gardner-Denver*

all these laboratories. There must be some general method of attack. Somebody said that three or four of the problems perfected in a year would justify all the money spent for research, and somebody else recommended that we should not start research in the first place unless it is justifiable. Another angle is how we can capitalize on the research that has been developed. It seems to me that there ought to be common methods of how the company can get information and how best to capitalize it."

Economic justification for research, to be expressed in terms of profits, was advanced by two others in these words: "I think we should let the laboratories have a free hand in doing the work and have as our objective 'profit.' Someone else made the statement that if any of our research laboratories can point to three or four accomplishments within the year, the benefits that will have been derived will more than pay for the activity. Any positive research if given time will, I think, help in all industries. We often do things that we can't justify when we start them, but experience has shown that in years to come any knowledge that we gain through research is well worth while."

"The trip as a whole, to my mind, has made me a little bit more profit conscious in research than I was before. I wonder whether there isn't a little more thinking to be done about research profit for an industry."

The value of co-operation, hinted at already in remarks on the justification of research, was stressed more heavily by others, who found in the tour further opportunities for the Industrial Research Institute to increase its usefulness. One observer declared: "In the Hoover Company, I was tremendously impressed with the amount of functional research which is going on, and with the splendid way in which the different fields are organized as independent functional units. The pilot plant [of the Jones and Laughlin Steel Corporation] enables them to shut down a piece of equipment on the order of an inspector. I have always been aware of the extreme value of contacts with outside companies as a means of speeding up research and getting new ideas. In connection with the visit to the Hercules Company, I think that when one industry can get together with another industry and work in close co-operation with it, a great many of our problems can be solved far more easily."

"The institute can be of great service to the businesses represented by us," another stated. "I feel that one handicap research has had in the past, and has now, is the trouble in getting from executives the financial support that we need because we have not had enough objectivity in our work. I believe the institute will help us realize objectives quicker and at a lesser cost."

The human factor and the historical element in modern industrial research impressed the group, as this comment shows: "Research is cast in no common mold. It's a living, breathing organization of human beings who have dedicated themselves to 'an organized diligent search for facts.' Research is a person — science in overalls at the workbench of industry. Any research organization which works well in a particular company in the specific relations with other departments within the frame of reference of that industrial organization is a good research organization."

"Contrast the informal family atmosphere of the earlier days of General Electric laboratories when Whitney ['90], dean of industrial scientists, was molding genius and building Nobel Prize winners as well as new atomic structures in the House of Magic, with other great laboratories where the highly organized, effectively integrated research organization rivals the greatest military mechanisms of all time, and the various divisions, brigades, companies, platoons, and single

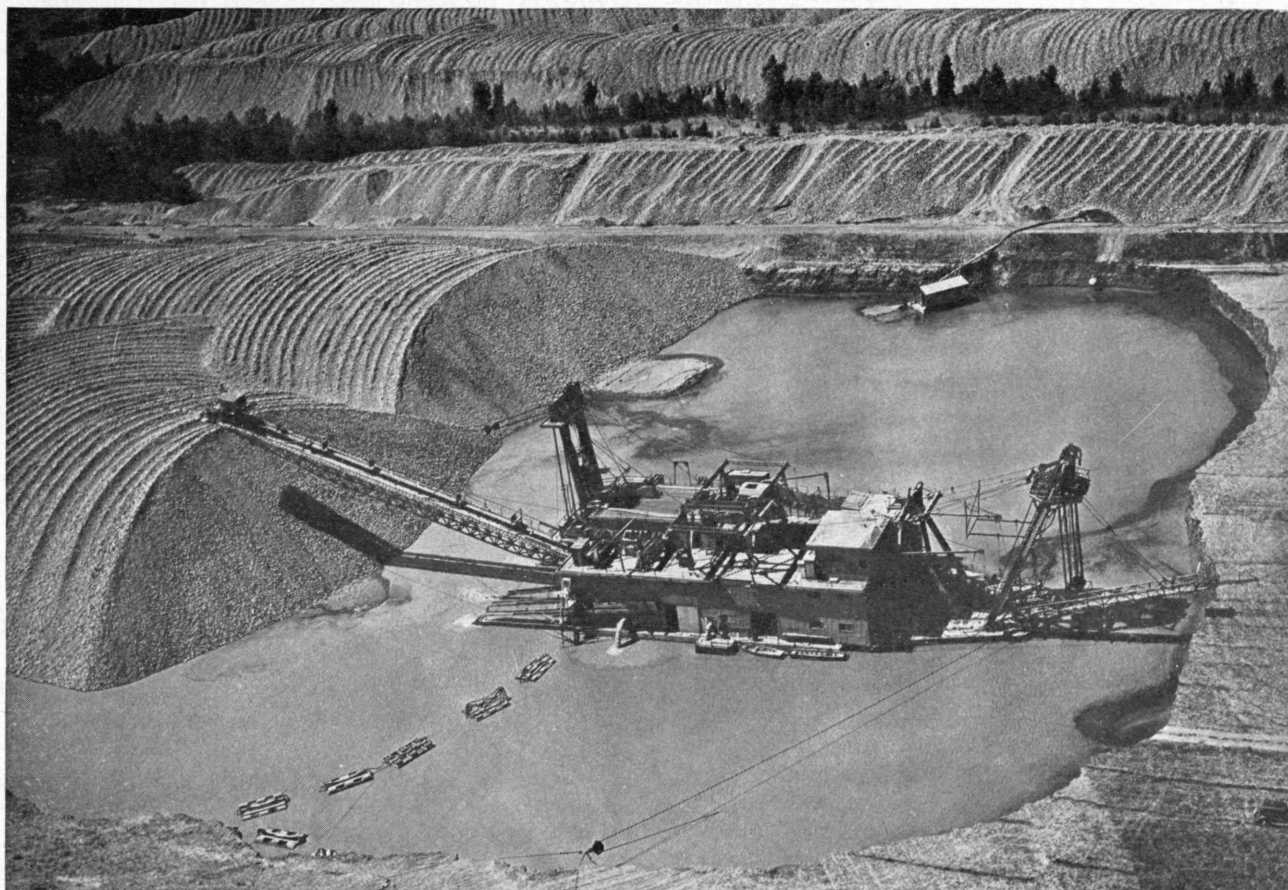
soldiers are deployed over the area of the unknown and sweep forward with the mobility and flexibility of modern mechanized forces. It was interesting to note the place of research within each company — the place physically, functionally, and in relation to the executive strata of company management. There was an interesting comparison of the place of research in relation to sales, production, technical services, in the three companies. I was struck with the environment of the three laboratory locations. . . . I began to wonder about the relation of research, production, and recreation facilities. What do research men do when they are not researching? . . . They fish! — both deep sea and fresh water. Some sail boats. Gives them time to think about some knotty problem, is the only explanation I can give."

My own chief impression, when I returned from this tour and gave it a little reflective thought, was that research is a person. I began to think of the tyranny of words. Research to me in fifteen years of promotion of science in industry has just been a word, but after this Industrial Research Institute tour it is a person. At the Hoover Company it is H. Earl Hoover, Vice-President in Charge of Research, who twenty-odd years ago, as a young engineer, started to put real engineering analysis and science in overalls to work on vacuum cleaners. Research is a person in the form of Herbert W. Graham, chairman of the Industrial Research Institute, as he sat at the controls of the Jones and Laughlin pilot plant,

the "technical guts" of the new steel industry which is just emerging. Research is a person in the form of A. O. Pickett, presiding over the experiment station of Hercules Powder on the brow of a hill, an inspired leader of a group of young, enthusiastic scientists in overalls, who reminds one more of a dean of an engineering college with his research staff than of a high-powered industrial executive in hot pursuit of the almighty dollar. It may be trite, but it nevertheless seems to me true, that most of our contemporary industrial research organizations are but the lengthening shadows of men. Take that man apart, find out what kind of man he is among men, learn something of his intellectual habits and his out-of-office hobbies, and you will have a pretty fair index of the kind and character of research organization which he is developing.

Here are a few of the questions raised in the mind of at least one "itinerant research observer," during our inspection tour in this land of new ideas: Is research a factor in the capital invested in plant and processes in a manufacturing company? In the obsolescence rate and the long-term capital investment operations in a specific industry? Can research be put on actuarial basis; is there some formula in the relation of research expenditures to capital assets or net sales? Is it true or not that the longer a company is in research the more nearly fundamental its attack on the science and technology underlying that industry? Would a check on the date of estab-

*A gold dredge at work in California, its 18-cubic-foot buckets gathering in ore-bearing gravel, the refuse of which is spewed out in sweeping slopes behind*



*Yuba Manufacturing Company*



lishment of a score or more of industrial research laboratories and the percentage of their research budgets in pure science, applied science, and commercial development of products, disclose some formula which would be a guidepost for those companies embarking upon a research career? Is there a difference in the relationship functionally of research to production, sales, and service in the mechanical versus the chemical industries? Is there a relation between the expenditures for research and the growth factor about which we hear so much from market letters and investment counsel? Would a case-history study of the growth factor in representative manufacturing companies and research expenditures be of some practical assistance to investment bankers and stockholders? Can research be considered an insurance policy for industrial life? If so, how is the research executive to justify the invisible items and accomplishments of research in the balance sheet?

I am not prepared to give the answers to these questions. But if one three-day tour of representative research laboratories will raise as many questions which seem to be fundamental to the further development and growth particularly of science-aided industries, I think the investment in time and effort is worth while.

### Science on Three Fronts

THE fall has witnessed the appearance of three distinctive books about science, each quite different but all adding together to afford an inclusive picture of the ways in which one may set about to popularize science. Review readers are already familiar with a part of the contents of *Atoms in Action* \* (see The Review, November, 1937, page 22; May, 1938, page 315; November, 1938, page 17) by George Russell Harrison, Professor of Physics, director of applied physics and of the research laboratory of experimental physics at Technology. But attractive as these articles were when they appeared on these pages, they gave no impression then of the cumulative effect produced when they are combined with those which cover the rest of the field of applied physics.

Professor Harrison goes at once to the point of showing how certain principles of modern physics have been and are being practically applied in contemporary life. He ranges through the fields of agriculture, communication, transportation, medicine, music, construction, weather—in fact, it is doubtful that he leaves untouched any important activity of man except that lethal art which most preoccupies the world at present.

Because Professor Harrison has an engaging style, because he is interested and very well informed, because his technique of writing is abundantly clear, the book is an unquestioned success. It starts slowly, for the writer is not at his best in agriculture; and it slows a little toward the end, because again he is not at ease in the building industry. But the middle section, which deals with those matters of electronics and spectroscopy and other fields of experimental physics which the author loves best, has a definite sweep and a positive interest. Taken as a whole the book is clearly outstanding as a story and able as an exponent of the factual method in popularization.

\* New York: Morrow, 1939. x, 370 pages, \$3.50.

David O. Woodbury, '21, has approached the task of popularizing science from the human side in *The Glass Giant of Palomar*.† This is the epic of the late George Ellery Hale, '90, inventor of the spectroheliograph, for years director of the Mount Wilson Observatory, guiding spirit in the current great astronomical undertaking—the later epic of the engineering triumphs needed to bring to physical completion the 200-inch reflector on Mount Palomar. This book also starts somewhat slowly, but after some seventy-five pages it is steadily interesting and even exciting. The tales of the early mountaineering efforts on Mount Wilson, of the stern and ultimately unsuccessful research in quartz led by Elihu Thomson, once acting president of the Institute, of the gruelling years spent by McCauley at Corning, all have the sweep and intensity of great events. They afford brilliant contrast to the quiet monastic labor of the glass polishers immured in their dust-free rooms for years on end.

The restrictions imposed upon Mr. Woodbury by his choice of genre preclude much consideration of the social implications of his subject. Rather, he deals in the heroics of science. We find here celebration of the qualities of the leader: self-sacrifice, intensity of purpose, brilliance of execution, daring coupled with sense, the ability to employ others to the top of their respective bents. But it must be recalled that devotion to a single ideal is not limited to science alone; Woodbury does not demonstrate just what attainment of the objectives of the 200-inch mirror will justify the unquestioned energies and talents which have gone into its creation.

Professor Harrison as reporter of present-day applications of physics has, of course, a vast supply of intrinsically fascinating material on which to draw. The success of his book results from his shrewdness of selection from this store and his enthusiasm in recounting the tale of his selections. In eschewing statements of philosophy he imposes upon himself a limitation which may be regretted because his observations upon science as a social force would be of interest and value. Science factually reported may often appear as an indulgent father showering innumerable blessings on a rather stupid child. The question of whether the child is old enough to utilize these expensive gifts well or even safely must concern that father. Even if the child should not engage in bombings and gassings, it may be serious enough that he is willing to fix his ear hour after hour to the banalities of the air, to fix his sight on the moving-picture shambles of a children's classic.

On this score *Modern Science* ‡ by Hyman Levy, professor of mathematics at the Imperial College of Science and Technology, South Kensington, is of importance. It has the sound English style which has been the heritage of British scientists since Tyndall and Darwin. For the layman it covers the principal phenomena of science history more clearly if less comprehensively than the impressive recent *Science for the Citizen* by Hogben. Less instructive in the literal sense, it will be more instructive in the spiritual sense, for it places the history of science against a living canvas of social and economic history. Hogben, too, essayed (*Concluded on page 32*)

† New York: Dodd, Mead, 1939. xiii, 368 pages, \$3.00.

‡ New York: Knopf, 1939. x, 736 pages, \$5.00.

# Looking Ahead in Research

## *Acceleration of the Rate of Scientific Discovery Will Increase Steadily within Human Limitations—Science as the Road Away from War*

BY KARL T. COMPTON

**R**EADING the future is a very interesting subject and has had a very interesting history. All grades of forecasting, from hocus-pocus and racket to art and science, have coexisted as part of man's struggle for a more satisfying life. Prophecy flourished with the soothsayers of Egypt and the oracles of Greece; it lost none of its growth in the hands of the astrologers of the Middle Ages; it is practiced today by weather prophets, investment counselors, and a host of similar servicers. Undertaking discussion of what may lie ahead in research raises the immediate problem of deciding on the exact form of art which shall be employed in disclosing the future.

The soothsayers of India were in the custom of concentrating their thoughts by gazing into spheres of natural crystal. The student of science today who assumes the role of soothsayer in order to look ahead in research may very well take a leaf from the Indians' book and make use of a gazing globe. Available to him are globes indistinguishable by inspection from the quartz spheres used by his Eastern prototypes; clear, beautiful, these modern scientific globes are made of a plastic material which epitomizes the effectiveness and the elements of Twentieth Century research.

I see in such a sphere a story of co-operative research by many investigators who selected what they needed from the voluminous records of former scientific discoveries, often apparently unrelated to each other. They co-ordinated this knowledge, added to it, developed an art of manipulation suited to their needs, and kept their imagination alert to the possibilities of practical use. Some stages of the work seemed at the time to be insignificant; occasionally some step appeared to open up new pioneering territory; all co-ordinated, these efforts gave us a valuable new product.

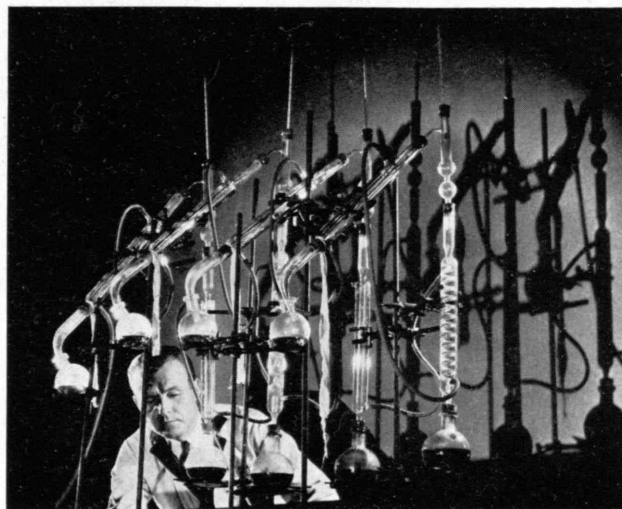
**VITAL MATERIALS NEED NO MORE DEPEND ON CONQUEST—LABORATORIES, NOT LEGIONS, ESSENTIAL TO PROVIDE NECES-SITIES OF NATIONS — MOTOR FUEL FROM COAL — LACQUER TO REPLACE TIN — CHEMICAL SUBSTITUTES FOR RUBBER AND FOR SOIL — RESEARCH FOUND TO BE THE SOURCE OF NEEDED EMPLOYMENT**

This sphere tells me that the same essential story, differing only in its details, describes the development of the rubber industry. Charles Goodyear had some background of previous experience to start with, but he made a pioneering step into new territory when he heated crude rubber with sulphur. Subsequently accelerators and controls improved the process and the product. The practical importance of rubber has stimulated research to develop substitutes which may have even better properties than rubber for some of the uses to which rubber is put. Un-

doubtedly the scientific approach to rubber has stimulated the study of polymerization and the development of plastics. Important as these developments have been in themselves, they have become far more important as they have been co-ordinated with other developments in quite different fields, such as those in mechanical engineering and metallurgy, which all put together have produced such gigantic new industries as the automobile, or such as those involving both the physicist and the electrical engineer, which have utilized rubber insulation in so many important electrical devices.

While we recognize the fact that science in the sense and scope which we see about us today is a modern development, nevertheless this story which I read in the sphere has nowhere been described more beautifully and adequately than in the words of Aristotle: "The search for truth is in one way hard and in another easy, for it is evident that no one can grasp it fully or miss it wholly; but each adds to the knowledge of Nature and from all the facts assembled there arises a certain grandeur."

Why is it that, although Aristotle so truly grasped the road to the knowledge of nature, it is only within recent generations that we have come to what is now called the Scientific Era? Undoubtedly many factors



General Motors



have conspired in this development. One of them has been the relief from superstition and from dogmatism which has come with increasing knowledge of nature. Another has been the general acquirement of manual skills which came about largely through the influence of the Benedictine monks of the Middle Ages, who taught the dignity of human labor which previously had been held, in high circles, as fit only for slaves and serfs.

But I believe that there is another very important factor which has its bearing upon the future of scientific research and which can be illustrated as follows: Imagine that we know only one fact of nature. The probability that we shall be able to utilize this one fact to accomplish some given desire is very small. If, however, we know two facts of nature, the probability that we can use them is considerably multiplied, because we might use either one separately or we might use the two in combination. Similarly if we know three or four facts of nature, the number of combinations gives us greatly increased opportunity of finding some way of utilizing the facts advantageously. Roughly speaking, the possibility for advantageous use of our knowledge increases somewhat as the square of the number of facts of which our knowledge is composed. This simple, logical situation provides an explanation of the increasingly rapid application of science to the problems of life. We now know so many of the laws and relationships between matter and energy and we know so much about the properties of various materials that there are enormous scope and latitude in our search for those products or processes which will enable us in an advantageous fashion to have the things and do the things which we desire. Reciprocally, these practical

California Department of Public Works



applications of scientific knowledge have given an enormous impetus to the search for new knowledge. Because of this logical situation, it seems to me that we can look forward with certainty to a continually accelerated rate of scientific discovery and of the practical applications of science in invention and engineering. If there is any limit to this acceleration, it lies probably in the limited capacity of our poor human minds to grasp and to deal effectively with the mass of information which is potentially available for our use.

To be a little more specific as I look forward in research, I cannot list what the new research developments will be because I do not know. In fact it has always appeared to me that no research really deserves the name if its result could be foretold when it began. But although I cannot tell specifically what the new research developments will be, I do think that it is possible to write with a good deal of assurance with regard to their general nature and significance. Perhaps as good a way as any to do this is to think of research in its relation to our present great problems.

At this moment undoubtedly the greatest concern of the world is war and threat of war. A good deal has been said about the ways in which science has been applied to make warfare more destructive, just as science has also been applied to bring about a certain compensating degree of protection against new weapons. But there is one possibility in science which seems to me to be far more significant than these, namely, the use of science to remove some of the major causes of war.

In so far as wars are caused by the natural "cussedness" of human nature, science can contribute, if at all, only very indirectly. It can probably not do much toward removing the desire which some men have for great domination. It cannot remove ambition and envy. But in so far as wars may be induced by economic considerations, science may do much to remove causes.

One of the earliest incentives to war was the invasion of one country by another for the purpose of loot. Later, as we became more civilized, actual looting as a motive yielded place to the control of population for the purposes of taxation and the exploitation of labor and of natural resources. This is all part of the old primitive instinct of animals and men to secure the good things of life by taking them from someone else.

Science, however, has given mankind a method of gaining the good things of life without taking them from someone else and without working inordinately long and hard to produce them. Discovery and development of good things of life by science, engineering, and invention are far more certain and productive sources than organized loot and robbery. To the extent therefore that great groups of people, such as nations, can be induced to support technological development directed toward these ends, to that extent can they satisfy their desires without recourse to war.

More specifically, many nations have felt the urge to conquest in order to secure to themselves an assured supply of various materials which are necessary to the

*Somewhere ahead on the highways of research, motor fuel from coal will free nations from dependence upon remote supplies; substitutes for rubber will remove "one of the great causes of anxiety. . ."*

nation's economy. For example, Great Britain needs oil for her navy and food for her population, which cannot be produced in the British Isles. Germany and Japan need rubber, foodstuffs, and mineral resources. Even the United States — richest of all nations in its mineral resources — is inadequately supplied with such important materials as rubber, tin, and tungsten. Does national safety force these nations to conquest in order to assure themselves of these commodities?

I believe that the record which I read in the crystal sphere justifies the assertion that the necessities of national economies could be taken care of by scientific research at a cost far less than that of a major war and within a time far less than that in which the effects of a major war could be overcome. At the same time this could be done not only without hurting anyone but with great indirect benefit to all concerned. Let me give a few examples: The time will surely come in the not too distant future when a satisfactory motor fuel can be produced from coal at a cost which is not too far out of line with that of petroleum products. When this happens Great Britain, for example, will no longer be critically dependent upon the Persian oil fields, nor shall we be so much worried about Japan's efforts to secure a foothold in Mexico. When substitutes for rubber are produced which are satisfactory for automobile tires and which can be produced at a reasonably competitive price, then one of the great causes of anxiety and international haggling will have been removed. Perhaps the new development of "chemical agriculture" in which farm products are produced without soil by being planted so their roots are bathed in appropriately nutritive chemical solutions can be extended to remove the fear of food shortage which now causes so much anxiety in several nations, and at the same time to provide a diet which will be a distinct improvement on that which is now customary. The development of suitable lacquers as substitutes for tin in the coating of containers for canned foods will make the United States less anxious about its access to the Bolivian tin supply. Or perhaps improved methods of extraction from our existing but rather poor tin deposits may accomplish the same result. To the extent that science can produce these materials or suitable substitutes, to that extent will be removed almost the only basis for war which can be intelligently argued for at the present time.

Undoubtedly the second great problem which faces our nation most critically today is the problem of unemployment. There has been much progress in the past decade in clarifying the public mind with regard to the relation of science to this problem. I will therefore not discuss it further except to present three citations.

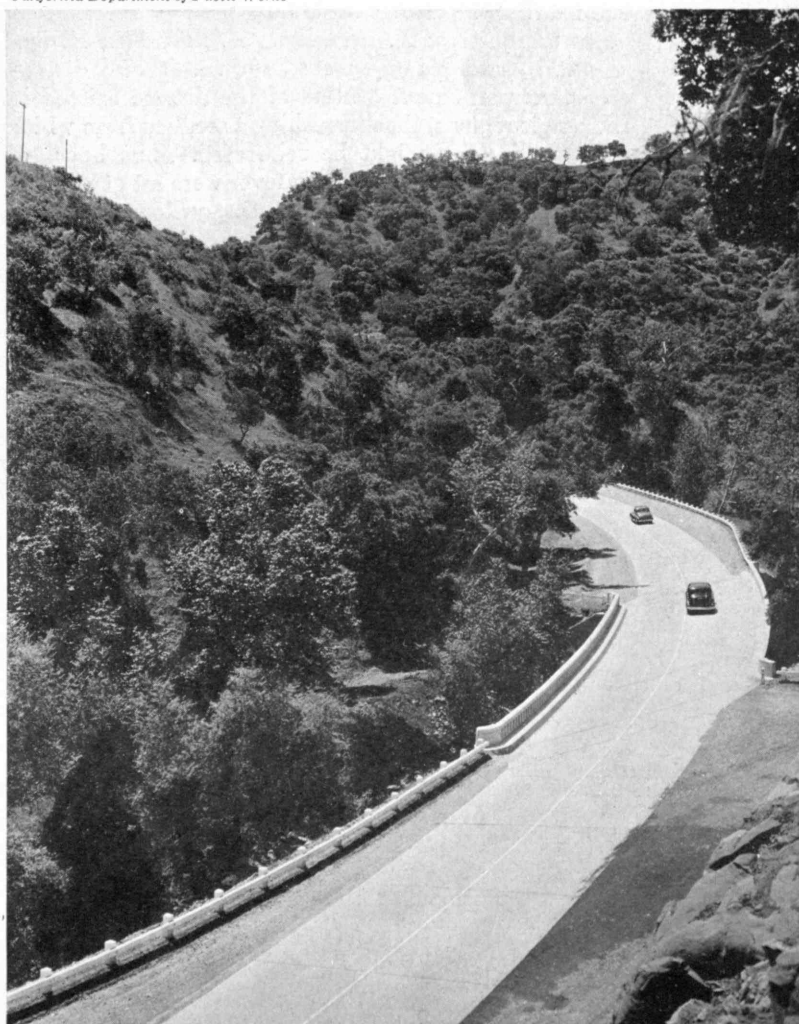
Charles F. Kettering wrote a couple of years ago: "We have in this country an excess of materials, an excess of money and an excess of men, all of which to a primitive mind like mine means that we haven't any projects to work on. We think we are technologically ahead instead of being technologically behind; and if we could get out of our minds the idea that we know a lot

about everything and realize that the whole thing is ahead of us, then we would have a shortage of labor in no time."

A notion of what science and technology have meant to the world in the matter of employment can be illustrated vividly by contrast if we read Macaulay's *History of England*. We find there that just before the scientific age one-third of the entire population was on poor relief. We get there a picture of the dismal and desperate surroundings and the drudgery in the life of the common people. At the present time, although there is still serious unemployment, we can point to the fact that a much larger population is being supported than in the time of which Macaulay wrote, and we can see that the standard of living has been enormously improved, even for those who are at present unemployed.

The third citation, which refers specifically to the chemical industry and is particularly important because this is one of the industries which is very modern and entirely due to research, consists of two paragraphs from a recent issue of the magazine *Industry*, based on records from the United States Bureau of Labor Statistics and the National Industrial Conference Board: "Employment today in the chemical industry is 27 per cent higher than in 1929 although manufacturing generally is still about 5 per cent lower than the 1929 peak. The chemical industry's average hourly wage, also average weekly wage, is 15 per cent higher than for all manufacturing. The chemical factory worker earns on the average \$31 a week compared with an average of \$26 a week for all manufacturing industries." The third great question facing all of us individually and in groups today is the question of profit. (*Concluded on page 32*)

California Department of Public Works



... These sweeping roadways, themselves the embodiment of many results of research and the stimulus of other investigations, are parts of the Nojoqui Canyon Highway in California.



# Historic Yellow Jack

## *South American Battles with an Elusive Virus Recall Earlier Medical Preoccupations in the United States*

BY ARTHUR M. YORK

MENTION of yellow fever suggests to many of us nothing more than historical accounts of a dead disease, one that took heavy toll of life during the last century but one that was tracked down by the scientist and swiftly wiped out. Such accounts as these, though pleasant, are hardly accurate, however, for yellow fever even in our times has proved a stubborn foe to public-health workers, as in past times it far more greatly perplexed their predecessors.

Its recent history in broad outline: In 1915, the Rockefeller Foundation undertook to eliminate the disease from the Americas. Within a decade, the anti-mosquito measures that had driven the fever from the United States in the early years of the century appeared to have accomplished the objective for the hemisphere. The disease persisted in Brazil, however, and a most discouraging defeat occurred in 1935, when the foundation's workers encountered yellow fever in the Brazilian jungles, far from the towns and cities which had been believed to be the only haunts of the *Aedes aegypti* mosquito, then the only known carrier of the disease. By the end of last year, the foundation had learned that the disease could be carried by at least four other mosquitoes: *A. scapularis*, *A. fluviatilis*, *A. leucocelænus*, and *Hæmagogus capricorni*. It also discovered that permanent centers of the disease existed in the jungle regions, thus furnishing a seedbed from which towns and cities might be reinfected. Thus hopes of complete eradication of yellow fever were set at naught, and Brazil led the way in accepting yellow fever as a permanent national problem. The setback thus registered was offset in good measure, however, by the use

of a vaccine virus which was developed in 1937. During 1938 more than a million South Americans secured full or partial immunity by its use. In consequence, Raymond B. Fosdick, President of the Rockefeller

Foundation, was able to report that "although yellow fever is still a serious public health problem, there are substantial grounds for believing that the battle is at least half won. Unless the disease should break out in some country like India, for example, where it has never before been found, the future would seem reasonably assured."

The possible sweep of yellow fever in a land like India is suggested by the ravages of malaria in Brazil during the past year. Over 90 per cent of the population of the Jaguaribe Valley of the state of Ceará, for instance, was affected. Mortality in some districts was reckoned at 10 per cent; in some regions the epidemic was so disabling that no crops were planted. Nearly all persons in the affected areas were expected to be thrown on government relief as a result. Malaria was brought to South America from Africa by the importation of another dread mosquito, *Anopheles gambiae*, either by airplane or by fast ship. The plane seems to offer the greatest threat of spreading both this disease and yellow fever. Hence it is part of air-line routine to inspect and spray the interiors of all planes entering the United States from the south, so that no insect stowaway may smuggle in the yellow-fever virus and pass it on to a human victim and thence to a waiting *A. aegypti*.

If yellow jack did come again to the United States, its invasion would be but the return of a visitor already unpleasantly familiar to American life. At one period, which reached its high point in the great epidemic of 1793 in Philadelphia, yellow fever was the leading cause of death among our people. The impact of the disease was so great that it left deep imprints upon the literature of the day. Charles Brockden Brown, first American novelist, wrote one whole book, *Arthur Mervyn*, around the theme of the memorable Philadelphia epidemic of 1793 and gave the alarming events of that same season a prominent place in the background of *Wieland*, his first novel. Philip Freneau, first notable American poet, was probably talking about yellow fever in his poem *The British Prison-Ship*. Half a century later, the Philadelphia epidemic was still so well remembered that another novelist, Dr. S. Weir Mitchell, redramatized the events of the summer of 1793 in *The Red City*.

Among other results of this first invasion of America by yellow fever may be classed the origin of the first American medical journal, the *Medical Repository*, which was published, roughly, during the first quarter of the Nineteenth Century and which affords many interesting contrasts with present strategy against yellow jack. The disease had made a few short visits

Severin from Black Star



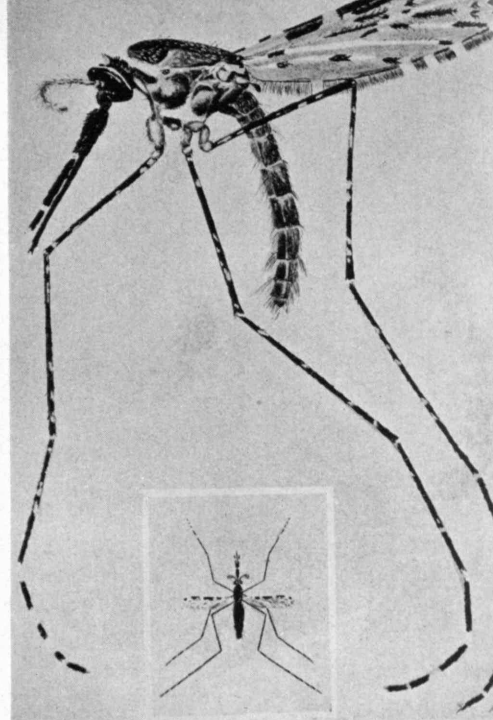
In northern Bolivia this crock contains safeguarded water, for the letter "P," chalked on it, means that Rockefeller Foundation yellow-fever fighters have dumped into it a ladleful of small fish to feed on any larvae it might contain.

here during Colonial times, but its full force had not been realized until the epidemic in Philadelphia, where an average of three hundred died a week and where two thousand were killed during October alone. It was recognized that the time had come for an organized fight against the disease. Young and promising Dr. Elihu Hubbard Smith envisioned a long-range campaign against yellow fever and gave his idea its first momentum in the establishment of the *Repository*, which was to unite the efforts of many scattered physicians. With the help of Dr. Samuel Latham Mitchill and Dr. Edward Miller, Dr. Smith offered the journal to the doctors in 1797, just four years after the Philadelphia epidemic.

In the "Circular Address" which announced the *Repository* and which was reprinted with the first volume of the journal, Dr. Smith declared his belief that the journal could best serve medicine of the period by effectively pooling the experiences of many American doctors who were faced with baffling epidemics in numerous coastal cities from Boston to New Orleans, and he sent out a plea for the observation of all the minute facts concerning the epidemics, including weather, climate, topography, and vegetation. He begged doctors to get to the root of the disease and to avoid all useless theorizing and speculation. Although Dr. Smith himself succumbed to yellow fever before a second volume of the *Repository* had been published, his successors carried on his purpose through the remaining twenty-two volumes of the journal.

As an example of publishing technique the *Repository* was of the crudest; but as a pioneering attempt to enable scientific men, particularly those of the medical profession, to share knowledge through a new medium, it was a great success. As it stands today on the back shelves of a very few medical libraries, the *Repository* is a little-explored source of interesting information

*Not a yellow-fever mosquito. Anopheles gambiae offers as great a threat by bringing malaria from Africa to the Western Hemisphere. This sketch is from Alwen Evans' Guide to the Anophelines of Tropical and South Africa (University Press of Liverpool).*

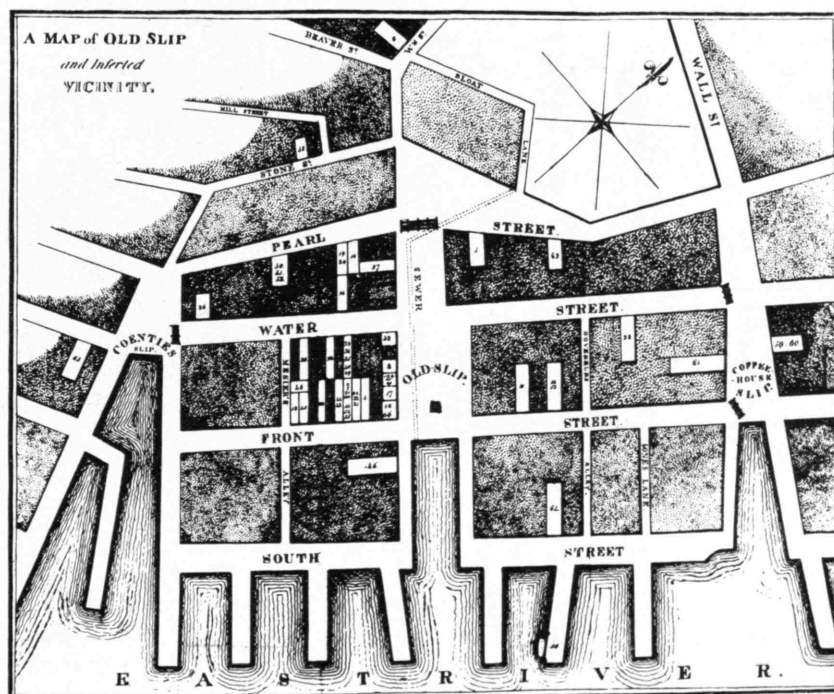


Science Serv

about early yellow fever in this country. Since it set down the data of dozens of epidemics just as reported by the physicians in each of the cities where the disease was rife, there can hardly be better evidence of the firsthand observations made by early investigators of the disease, their theories of its cause, and their methods of coping with it and seeking its ultimate extinction. Articles on yellow fever were so numerous in the *Repository* that it might be said that, without the journal, yellow fever might have taken many more victims than it did before doctors became acquainted with its idiosyncrasies; and that, without yellow fever, the *Repository* might have died an early death for want of material.

That yellow fever was then new to the medical profession is demonstrated by the approach which these doctors took to the disease in their accounts of the epidemics. In their attempts to overlook not the slightest clue, they described every detail of symptoms and of the attempted methods of cure, as well as the weather, climate, and topography of the localities, and the extent of plant and animal life. (Continued on page 34)

*This map accompanied the article, "Observations on Yellow Fever," by Dr. Felix Pascalis as it appeared in Volume 4, Number 1 (1801), of the Medical Repository. The map demonstrates how the then current epidemic of yellow fever in New York City was concentrated within a small area near Old Slip. Each number on the map indicated a case of yellow fever in the order of its appearance. The fact that more than half of the cases appeared within a single block which was adjacent to the slip led Pascalis and his contemporaries to believe that this and other epidemics of the disease were generated in city filth, particularly that along the water front.*



Boston Medical Library



# Ultimate and Indivisible

## *Surveying the Fundamental Particles Composing Matter and Energy Leads to a Who's Who of the Unseen*

BY PHILIP M. MORSE

IT seems to have begun with Democritus, this idea of matter's being composed of fundamental, indivisible atoms. Centuries after the time of the great Greek, Dalton used the newly found facts of chemistry to give substance to the speculation. Today we are sure that all matter and all energy are built out of a few kinds of fundamental particles. But we are not sure just how many kinds of particles there are. Nor are we quite sure whether they are really particles and not waves. The investigations by means of which we have reached both our present surety and our present doubts have brought to light particles that would puzzle Democritus, and to language terms that often torment the reader. A survey of this development really resolves itself into a who's who of the unseen.

The *photon*, the elementary particle of which light is made, is probably the least mysterious of all the unit building blocks, but even here familiarity has been

achieved with difficulty. In the latter part of the Seventeenth Century, Newton asserted that light was composed of subtle corpuscles which shot in straight lines out from the source. He may have had his doubts as to the adequacy of such a simple theory, but his worshipers took it as gospel, and about a hundred years elapsed before a more nearly correct picture could prevail. Certain properties of light, such as interference and polarization, which had been discovered meantime, could be explained only if the radiation were considered to have wave properties. As soon as they were shown that very short waves could travel in straight lines, as do streams of corpuscles, and could likewise show the observed interference effects, scientists felt that light was entirely wave motion in a mysterious medium called the ether.

This view held until the last decade, though numerous difficulties with the pure wave theory began cropping up as early as 1900. For instance, dim light was found

### Particle Particulars

<i>Particle</i>	<i>Mass</i>	<i>Electric Charge</i>	<i>When Created or Lost</i>	<i>Uses</i>
Photon	None	None	Created when an electric charge radiates energy; lost when its energy is absorbed by a charge	Makes up light and other electromagnetic radiation. The carrier of electrical energy
Electron	About an octillionth of a gram	About two ten-quintillionths of a coulomb, negative sign	Sometimes created in, and ejected from, a nucleus. Can be created, along with positron, near a nucleus	Makes up outer structure of all atoms. Responsible for their chemical behavior. Also present in cosmic rays
Positron	Same as electron	Same magnitude as electron, positive sign	Sometimes created in nucleus. Can disappear by combining with electron, leaving two photons	A secondary constituent of cosmic rays. Too transitory to be of much other use
Proton	About two thousand times heavier than electron	Same as positron	Can be changed into a neutron inside a nucleus, producing a positron or destroying an electron in the process	The nucleus of an ordinary hydrogen atom. A constituent of all nuclei. Responsible for the nuclear charge and part of the mass. Also present in cosmic rays
Neutron	Slightly heavier than proton	None	Can be changed into a proton inside a nucleus, producing an electron or destroying a positron in the process	A constituent of all nuclei. Responsible, together with the proton, for the nuclear mass. Most nuclei contain nearly equal numbers of neutrons and protons
Neutrino (existence possible)	Much less than electronic mass, possibly zero	None	Perhaps created along with electron or positron when proton changes to neutron or vice versa	None known, except perhaps to carry away some of the energy and spin when electron or positron is created in a nucleus
Meson (existence likely)	About a hundred times heavier than electron	Possibly two particles with opposite charge, similar to electron-positron pair. Perhaps also a neutral particle	Possibly created during nuclear radiation of energy	Possibly an analogue of the photon, carrying the energy of nuclear forces. Present in cosmic rays

*Note:* The disappearance of mass requires the production of about a half a million electron volts of energy for each electron-mass unit which disappears. An equal amount of energy must disappear when an equal mass is created. Electric charge can be transferred from particle to particle during a change, equal amounts of positive and negative charge can be created simultaneously, but total *net* charge cannot be altered.

to make photoelectrons burst from a metal surface with just as great a muzzle velocity as does bright light. Dim light blasts off fewer electrons per second than does intense light, but the individual blasts are the same strength in either light. This discovery (and others like it) pointed back to the outmoded corpuscle theory again; each corpuscle blasted off one electron, and each corpuscle had the same energy; dim light had fewer corpuscles per second. But what was to be done about the interference and other properties which are typical of wave motion? Somehow light had to be at the same time a barrage of explosive shells and also a train of waves. Only recently has the paradox been resolved.

As a matter of fact, a paradox exists only if we insist that light corpuscles be "real" corpuscles, obeying the laws of ordinary ballistics, and that light waves be "actual" waves, similar to those in elastic solids. Light must be corpuscular in that electrons and atoms are struck by it as by bullets, but the corpuscles cannot be governed by the usual laws of ballistics; the intensity of the barrage must be governed by laws similar to those which govern waves. When we study the fine details of light (as when we study photoelectrons), we see the corpuscular aspect; and when we study the general effect (as when we study interference), we see the average result required by the wave laws. This resolution of the paradox also disposes of the mysterious "ether" which was supposed to "carry" light waves. If the wave aspect is present only in rules governing corpuscles, the wave is not "real" and needs no carrier.

The light corpuscle, called the photon, is a compact bundle of energy whose trajectory is governed by wave laws. The amount of energy carried by each photon has been shown to be inversely proportional to the wavelength of the light whose energy it carries (or, rather,

to the wavelength of the wave law which governs the photon). Photons of radio and heat waves (long wavelengths) carry only small amounts of energy, and to be detected must fall in such numbers that the bombardment is almost continuous and the radiation simulates the smooth regularity of a "real" wave. On the other hand, photons of x-rays or those present in cosmic rays (very short wavelengths) carry so much energy that their individual collisions with atoms can readily be seen in a cloud chamber, and the radiation resembles a stream of "real" particles.

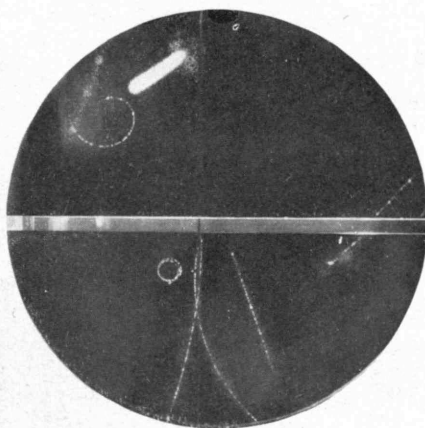
Photons are created by the motion of electric charges. Whenever an electron is restless and wishes to change from one quantum state to another having a lower energy, it gives up the net energy difference to a photon. When many electrons perform the same change each second, we say light is given off. The wavelength of the resulting light is such that each photon carries off just the energy each electron wishes to donate — a larger energy jump giving rise to a smaller wavelength. The photon travels away from the source, subject to the wave laws which govern its trajectory, until it reaches a target which is willing to receive its energy: a metal surface, a photographic plate, an eye. On giving up its energy, the photon vanishes.

Photons, therefore, have only a transitory life. They are usually created by electrons while changing state, and are usually absorbed by other electrons which must change state in order to absorb them. They constitute a postal service for electrically charged particles.

The next elementary particle in order of familiarity is the *electron*. It is more nearly similar to an ordinary bullet than is a photon, for it has a definite mass (about 0.000000 000000 000000 000000 0009 gram) and greater permanence than does the (Continued on page 38)

## Particle Pathways

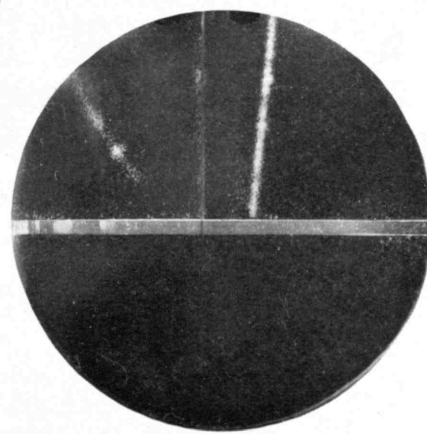
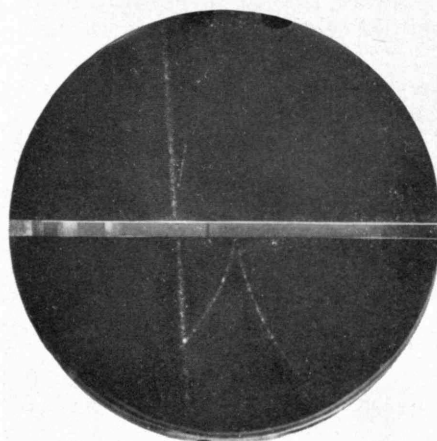
The path of an elementary particle traversing a cloud chamber in a magnetic field is marked by water droplets condensed on the wrecked atoms it leaves behind. The greater the curvature of the path, the smaller the particle's speed or mass. Below: the path of a meson going right through a half-centimeter lead plate, and, below the plate, the curved tracks of a positron-electron pair which was created in the lead plate by a photon, which leaves no track.



Photos by J. C. Street and E. C. Stevenson  
Harvard University

Above: near top, wide swath cut by an alpha particle, the relatively heavy nucleus of helium; below it, the graceful spiral of an electron, the path showing greater curvature as it slows up near the end. Below the lead plate: from left to right, paths of a slow electron, showing great curvature; of a positron-electron pair; and of a very fast electron. At extreme right: track of a meson, cutting clear through the lead plate and leaving the picture through the blackened backing plate of the chamber.

Below: two meson tracks and a proton track photographed a short time after transit, delay allowing droplets to drift apart somewhat, making counting easier. Droplet counts give an estimate of energy loss in a particle in transit and permit estimation of initial energies. The proton leaves the heavy trail of destruction at the right but cannot penetrate the lead plate bisecting the chamber. The less showy meson tracks penetrated the backing plate before reaching the lead plate.





# Chemist and Crime

## *Varied Work Falls to the Jack-of-all-Trades of the Police Department—Evidence Alone Not Enough*

BY FRANK C. STRATTON

CRIMINAL investigation has in recent years undergone many advances which, ironically enough, have registered in the popular mind the purely imaginary expert of fiction who is in himself a one-man police department. The complexity of actual police-work, however, sharply contradicts this idea. The investigation of a crime, real or imaginary, brings into operation men from many units: the route officer or officer from the cruising car who discovers the case or first visits the scene; special officers or plain-clothes men from the local station house who start investigation—locating witnesses, checking statements; detectives from headquarters and special officers from other divisions who may enter the case to investigate particular phases; photographers and fingerprint men who perform special technical tasks. In a homicide, the homicide unit sends a man to aid in the interrogation of witnesses; in a shooting case or an explosion, the ballistics expert is sent to the scene; in a case of forgery or a questioned document, the handwriting expert is called; and if the case or evidence warrants it, a chemist visits the scene and examines the evidence. Other small special units deal with arson, bombs, narcotics, radicals, missing persons. The men drawn from these professional groups form merely a basic nucleus of workers. As each case develops and the connections become clearer, special experts from varied industrial fields may be called in.

Thus it is evident that, contrary to fiction, the solution of a crime is the result of co-operative effort by a number of investigators. The patrolman and special officer are invaluable in providing suspects and evidence for the experts to develop into proof. Seldom is there a single-handed solution, although, according to the nature of

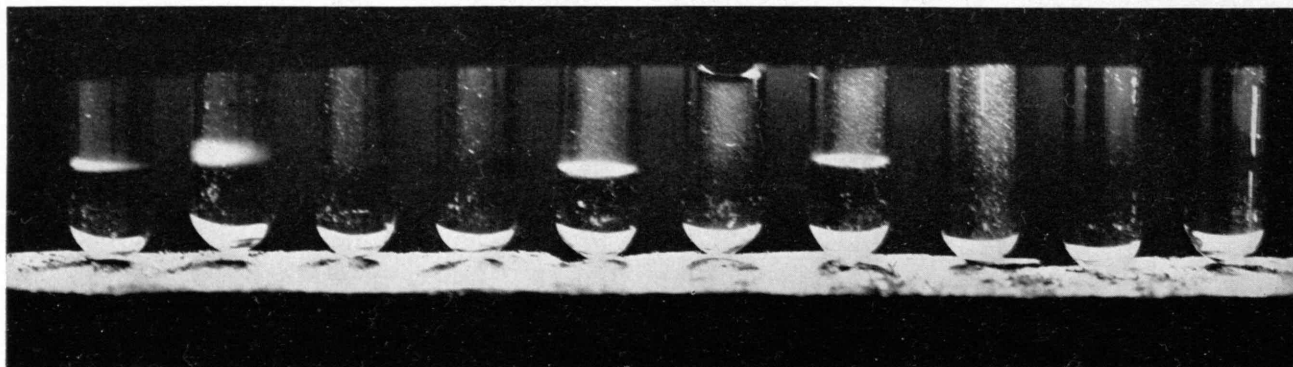
the case and evidence, a keyman or, more usually, two or three keymen may carry the main chain of evidence through to completion and conviction.

Real life also differs from fiction because in real life the police must be able to do more than secure enough evidence to know that a particular individual was the criminal. To know the criminal is only half the task; the other half is to develop enough proof for a lay jury to be convinced of his guilt beyond reasonable doubt. In a well-organized department the expert is not faced with the problem of catching the criminal, for in a majority of cases the criminal is locked up in the station house before the expert has finished collecting all the evidence. The major problem of the expert is to develop, from the evidence available, adequate proof for conviction.

Obviously, no department can afford to hold on salary all the experts who might possibly be needed. One expert, commonly the chemist, is expected to be a scientific jack-of-all-trades; that is, he must not only qualify as an expert chemist or toxicologist but he must also know enough about other special fields to be able to handle minor work in them, and to know when the services of an expert in a given field are worth while.

A survey of representative cases is of value in illustrating both the co-operative aspects of modern police-work and the part played in it by the chemist's technical knowledge. Murder cases might be expected to provide the most thrills for the reader, but from the point of view of technical interest in evidence the common hit-and-run automobile accident presents a variety of evidence no other type of case can match. Any single item of this evidence, of course, may be matched in a murder, but murders are less frequent and usually less interesting.

*Precipitin test for human protein. The tubes, from left to right, contain: human blood, known 1:1,000 dilution, plus antiserum; human bloodstain, estimated 1:1,000 dilution, plus antiserum; cow bloodstain, estimated 1:300 dilution, plus antiserum; pig bloodstain, estimated 1:300 dilution, plus antiserum; specimen 1, estimated 1:1,000 dilution, plus antiserum; specimen 1, estimated 1:1,000 dilution, plus normal serum; specimen 2, estimated 1:1,000 dilution, plus antiserum; specimen 2, estimated 1:1,000 dilution, plus normal serum; saline plus normal serum.*



In considering the evidence presented in these case reviews, the reader should remember that the problem of analysis here is a bit different from the usual analytical problem. The composition or conformation of the object or sample in question must be shown to meet a given specification; in other words, the specimen must be classified as belonging to a particular group. That, however, is not enough. If possible, one or more characteristics must be found which are unique and peculiar to that item of evidence, so as to prove beyond reasonable doubt that this one specimen, and *no other specimen of similar type*, is involved in the case. This proof may be a matter of chemistry but is more often a matter of keen observation and common sense.

Little can be done by the chemist in an automobile case until a suspected car has been located. He may visit the scene, make notes of it, learn the condition of the victim and the location and type of his injuries, and record all the possible items which may fit with evidence to be found when the car is located. What may that evidence be? From the cases described you will see that it may be almost anything under the sun.

The first thought in examining any car involved in an accident is blood. Suggestive stains or spots are scraped off with a clean scalpel or razor blade. Each is placed in a separate vial and tested later at the laboratory, first for blood pigment, by means of the hemin-crystal test, hemochromogen-crystal test, or the microspectroscope.

The test for blood pigment, however, does not differentiate between human and animal bloods. The precipitin or human-protein test, illustrated on page 24, is used to make this distinction. At intervals each forensic laboratory produces (in rabbits) an antiserum for human protein. Tested antiserum is stored in sterile ampoules for use when needed. A case specimen is extracted with normal saline solution (0.85 per cent NaCl). A few drops of antiserum are placed in the bottom of a small test tube. The stain extract is so added that it forms a distinct layer in contact with, and above, the antiserum. If the extract contains human protein, a precipitate will form at the line of contact between serum and stain extract. From these two tests — blood pigment and human protein — the presence of human blood is shown.

In many cases a stain of human blood on the car may be the sum total of evidence other than such damage as a dent or a broken head lamp. In other cases, other evidence may also be found. Examination of projecting parts and broken glass on the cars may reveal small fragments of tissue. These are first extracted with normal saline. The extract is poured off and used in a human-protein test. The tissue itself is then fixed, embedded, sectioned, stained, and examined microscopically, so that its type may be determined.

Sometimes hair is found on a car — maybe one or two hairs, maybe many. Hair from the victim is secured for comparison. While absolute identification cannot be made by means of hairs (commonly only a few are found on a car), the demonstration of likeness is another link in the chain of evidence. Hair which has been tinted or dyed shows likeness with more certainty.

Often a car may show fibers from clothing. These are examined for type and character, and comparison is made with material from the garments of the victim.

*Accumulating evidence. From the top: hair caught in the hinge of a hit-and-run car; hair of the woman victim, showing corresponding dye marks; rayon thread caught in the hinge; rayon thread from the dead woman's beret (dark material adjacent to it is paint)*

Likeness in all measurable characteristics may be shown. One such case, to which the accompanying photomicrographs refer, is particularly interesting: A woman was walking along the edge of a road when a dark, fast-traveling sedan swung out of line to pass a truck. The sedan struck the woman on the head and continued its way, cutting in on the truck. The truck driver noted three digits out of five on the plate. State police on the way to the scene recorded the numbers of passing cars, one of which included the digits reported by the truck driver. This car was traced outside the state to a garage in which it had been placed for dead storage later on the day of the accident.

Examination of the car revealed nothing suggestive other than a door hinge which was slightly out of line and which showed two short hairs. These were taken as evidence, and the hinge surface was scraped for possible traces of blood. Examination under the microscope at the laboratory demonstrated both specimens to be human hair, one showing an added color suggestive of a henna treatment. The length of each specimen was about one-quarter inch. Hair from the victim was received later and examined, some of the samples showing natural color and others showing varying degrees of an added pigment. Both hairs from the car hinge were easily matched with the comparison specimens.

The scrapings from the hinge failed to show any trace of blood. The microscopic examination, however, showed a number of minute fiber fragments which had the appearance of rayon. The lengths of these ranged from 1/35 to 1/125 of an inch. At the time of the first examination, the meaning of the fibers was unknown. The hat of the deceased was requested. This was found to be a brown velvet beret showing a perforation similar in outline to the car hinge. A few of the short fibers were pulled from the beret and, when examined under the microscope, showed complete correspondence to the minute fragments found on the hinge. Both were rayon of a flat filament type (edges slightly thickened), of the same width of filament, and of the same color. The hinge specimens were shorter than the beret specimens, and the minuteness of the hinge specimens made chemical tests unsatisfactory because of the difficulty in handling them. Microscopic examination was made, with and without polarizing equipment. Photomicrographs of both the rayon and hair were made for court use. These two points — the hair with its added pigment and the rayon fragments matching the beret — placed beyond reasonable doubt the identity of the fatal car.





One outstanding auto case did not produce any evidence from the deceased, but did offer several items from the scene. The victim was standing beside a parked car. Another car came at high speed around a curve, struck the parked car on the left rear, caught the man standing beside it, swerved across the street, and knocked over a young sapling. By the time the injured man had been sent to the hospital in an ambulance, the culprit car had disappeared. Police pieced together stories of various witnesses and located a suspected car. A careful, methodical examination of this car for evidence yielded four telling items: From the right front fender at a dent and from the right end of the front bumper were picked tiny fragments of paint. These matched in color, thickness, and coats that of the parked car. Three minute fragments of red-orange glass were found, which matched the taillight glass of the parked car. The undersurface of the front axle and the undersurface of the front bumper yielded small fragments of bark which matched the bark of the young sapling at the scene. The undersurface of the front bumper also yielded some minute fragments of green-painted wood which matched the stakes set about the young sapling for support and protection. Only *one* car could produce these four bits of evidence — guilt proved beyond reasonable doubt.

Here, as in all cases, the manner of presentation of evidence must be borne in mind. To the ordinary person, sight and touch mean more than a half-hour technical dissertation. Consequently, the small fragments were mounted between glass slides, so that they could be readily handled and the points of likeness could be clearly seen. Technically, however, paints, enamels, and other substances are usually examined in the spectrograph for the elements present. In addition, microscopic examination is made. The number of layers, or coats, and their colors are important for ascertaining individuality. A significant feature in glass from a lens is the presence of parts of mold markings. Bark and wood are subjected to gross visual examination, as well as to the hand lens, and sections may be made for microscopic examination. It is amusing to have spent hours in such detailed work only to have the layman, on seeing and handling the bit of evidence, say: "Why, it's obvious!"

In the following case a slightly different type of work was encountered: A small safe was stolen from a theater after a holiday week end. During the early morning the patrolman on the route next to the theater noticed a car bearing a registration which had been under suspicion of a break some weeks earlier. On leaving his route he heard of the break at the theater, reported the car, and described its occupants. The car, when later located with its owner, was carrying some pieces of studding, a rope which had been tied in a barrel hitch and was not wholly untied, and, on the floor, some small fragments of a plasterlike material.

The pieces of studding showed dents which were found to fit the wheels of a duplicate safe; the rope with the barrel hitch was found (as tied) to fit about this duplicate safe; analysis of specimens of safe insulation obtained from a duplicate safe by the special officer gave the same result as the analysis of the small fragments

found in the car. A jury returned a verdict of guilty. The chief problem here presented to the chemist was to show that the plasterlike material was safe insulation, and of the kind used by the manufacturer of the stolen safe. An outline was prepared of the composition of different materials which might be confused with safe insulation. The analysis was then carried out in such a way as to show likeness or unlikeness to these items. Since the usual directions for analysis call for large samples of material and these fragments were minute, micromethods from other fields of chemistry were used. The results in terms of separate elements were then estimated back to the probable original formula and compared with the items in the outline. The material from the car, when compared to the known safe insulation, gave a like composition and was unlike any of the probable mixtures which might be suggested as an alibi or explanation. In other words, it was safe insulation, not plaster or any of the common cement mixtures. Determination of the individual manufacturer was not difficult. The insulation contained a number of bright, clearly visible mineral inclusions, evident in both car and comparison specimens. Other safe insulation did not have them. Some of these inclusions were separated from the rest of the mixture for easy comparison.

Different cases call for different methods of analysis. Besides the basic method described, the spectrograph may be used to advantage. The inclusion of unusual minerals makes petrographic examination worth while; that is, analysis is made in order to show a basic type of composition, and then unusual elements or minerals are sought in order to show individuality.

The chemist also acts as an aide in other fields of criminal investigation. Bullets, the rims of bullet holes, minute fragments of metal, ricochet marks, may be analyzed in the spectrograph to show identity or to trace the line of fire. Minute traces of blood, hair, fiber, glass, bone, or other substances may be removed from distorted bullets, identified, and compared to material at the scene to help trace the line of fire. With close shots the powder pattern on clothing may be recorded by means of specially sensitized paper and a reagent for nitrites. This pattern can aid the ballistics expert in forming an opinion as to the distance from which the shot was fired. By treatments varied according to the metal, obliterated serial numbers may be restored. In other cases tests for powder residue may be made on the hands of a suspect. In bomb cases the residue on bomb fragments may be analyzed to show the type of explosive used. Still other material submitted for examination as evidence varies widely: fudge, vanishing cream, red lead, clamshells, dirt, wire, beverages, patent medicines, drugs.

Does the expert ever prove anyone innocent? Yes, sometimes. For example, a damaged car found in a garage was suspected of being a hit-and-run car. Examination of the damage revealed grass and vegetation alien to the scene of the accident. A verbal report was made that this damage had been done elsewhere than at the scene of the crime, and later a tracer disclosed that the car was recorded as in an accident within the jurisdiction of another department and hence not involved in the hit-and-run case. (*Continued on page 44*)

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# THE INSTITUTE GAZETTE

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PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

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## The President Reports

THE Institute begins its seventy-fifth academic year at a moment when war in Europe, as a threat to the advancement of enlightenment, presents an unmistakable challenge to educational institutions throughout the world. The first section of President Compton's annual report\* to the Corporation on October 11 frankly reckoned with that challenge:

"We meet at a critical time such as has occurred previously about once in each generation, but which we hoped in 1919 would never occur again. War and rumors of war again disturb our equilibrium and may threaten our peace on this continent. Through no desire of our

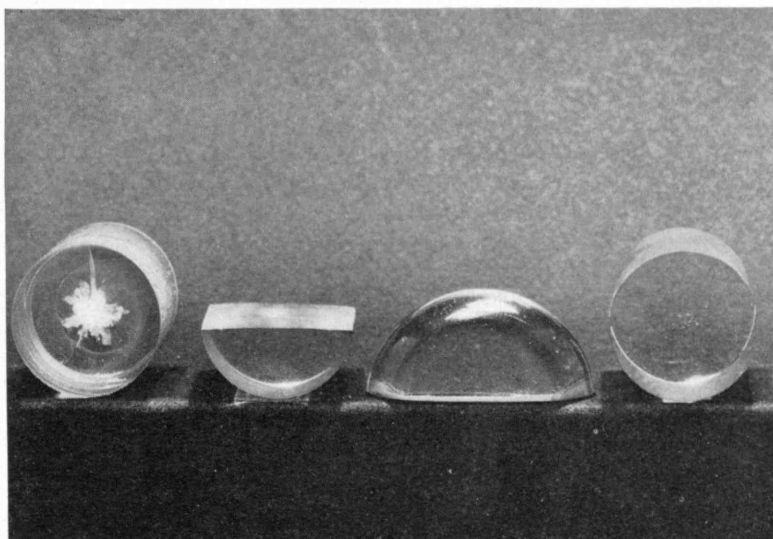
\* The Review hopes to present other important portions of Dr. Compton's report in subsequent issues.

own, indeed of any of the great peoples of the world, but through the past mistakes of all peoples and the selfish ideologies of a few of today's national leaders, we face another Old World conflict which challenges our ideals of free and peaceful pursuit of the arts of living. Undoubtedly the foremost problem before our educational institutions is to determine and follow such policies as will contribute most effectively to the maintenance of those ideals basic to our American life.

"Above all else our forefathers struggled to secure freedom and opportunity and to safeguard these as inalienable individual human rights for their posterity—for us and our children's children. To do so, they established our democratic form of government and adopted our Constitution. To make democratic government workable, they established a great system of

*Methyl methacrylate—Lucite to the generality—possesses spectacular properties in addition to its power to pipe light. Its molecular structure appears to be decidedly unusual, as these photographs indicate. Reading in reverse of the usual order—that is, from right to left—the lower photograph shows a cylinder of the material, then one half of such a cylinder, cut after the cylinder had been deformed by a pressure of some 14,000 pounds to the square inch. Next in line is the other half of the cylinder—likewise cut after the deformation. When cut, it was a duplicate of its neighbor. But after being cut, it was put in water which was then brought to a boil. In a few minutes, it had resumed its original dimensions, to within a thousandth of an inch. The squashed half cylinder, at room temperature, would regain about 25 per cent of its original form in a year; in two years it would gain about 26 per cent, and so on—returning to its full original shape only after so long a time that it is hardly worth bothering about. The fourth object photographed is a cylinder crushed until it cracked internally, then boiled to restore its original shape, with the internal cracks clustered about its longitudinal axis.*

End views of the cylinders are shown in the upper photograph. This unusual property of Lucite was encountered by Dr. James F. Bell who, as national research fellow in Geology at the Institute during 1938–1939, used the material as a transparent retaining medium in his studies of the deformation of crystals. Molecularly, it appears, Lucite consists of long-chain molecules which bend rather than break and which are unusual in their ability to be hastened back to original direction by heat.





education. We of the M.I.T. are a part of this system. While our immediate objectives are to discover and to teach the truth, especially in the realm of the physical world and man's adjustment to it, our ultimate objectives are those of our nation: to promote freedom and opportunity among men. For truth, in the form of exact knowledge, brings freedom and opportunity to those who gain it.

"It therefore seems to me that our first duty, in this time of turmoil and danger, is to carry on our normal educational program as effectively as possible and with a minimum of confusion. Whatever course future events may take, the world will need young men versed in science and skilled in the arts of its application to promote human welfare.

"A second duty also seems clear to me. Our staff and our laboratories are being increasingly found useful in making direct contributions to our country's welfare. Some of these activities are directed toward improved health or safety, others toward new or improved products and processes for industry, others toward assistance of both business and government in problems of personnel or of planning, and still others toward national defense. Great need in all these directions exists; we and others are only beginning, through experience, to realize how unusually effective our institution can be in meeting many aspects of such needs. We should seek definitely to expand and improve our operations in performing this type of direct public service.

"In the third place, we should be alert to the needs and opportunities for service to our country in direct proportion to the degree of national emergency which may exist. For example, certain technical problems of national defense might properly now engage the attention of our staff — problems which, under less portentous circumstances, should be given a lower priority or left to other auspices. If ever the extreme situation of a struggle for existence of our country or its ideals should befall us, then I am sure that we should do as we did in 1917 — temporarily subordinate our normal educational and research program and place all our facilities at the disposal of the nation, with suitable arrangements for their wise use.

"I believe the probability is very small that we shall have to face such an extreme situation, though present world events have already forced us to make some changes in our program, and we have made some others voluntarily. The best policy appears to me to be for the administrative officers of the institution to attempt to envisage and be somewhat prepared for any eventuality which might disturb our normal program, but otherwise for our entire staff and student body to depart from it as little as possible. I hope that the slogan 'business as usual,' or even 'business better every month,' may long be applicable on the educational front.

"While on this general subject I cannot refrain from a comment on the attitude of educators and scientists on certain aspects of the world situation. Whatever they may believe about the merits of the Versailles Treaty, or proposed readjustments, or the Munich agreement, or cash and carry versus embargo, I believe they are practically unanimous in condemning Germany's recent indiscriminate persecution of minorities without regard

to individual merit and are opposed to authoritarian control. On these fundamental issues we are definitely not neutral, and this is not for sentimental reasons but has a deep-seated basis.

"Authoritarian control is inherently contradictory to the spirit of science and the pursuit of knowledge. In the world of scholarship, there is no authority except the truth, as it can be demonstrated by observation, experiment, and experience. In the world of engineering, physical laws and economic analyses are the authority for all decisions. Every injection of authority based on the prejudices or selfish ambitions or objectives of people is a blow to scientific progress."

### *Staff Changes*

**P**ROMOTION of Charles S. Draper, '26, internationally known authority on airplane testing devices and flight instruments, to the rank of professor of aeronautical engineering, was the chief change in the Institute's faculty roster as the academic year began.

During a decade of teaching and research at the Institute, Professor Draper has contributed notably to progress in aviation through development of methods and equipment for testing airplane engines and aircraft in flight, as well as through the improvement of instruments of navigation. Following undergraduate study at Stanford University, Professor Draper came to Technology, where he was awarded the degrees of bachelor, master, and doctor of science in 1926, 1928, and 1938 respectively. He joined the staff in 1929 and was made assistant professor in 1935 and associate professor three years later.

Other changes in the Institute's staff included the promotion of Flavel Shurtleff of New York City to assistant professor of city planning, and the appointments of F. Leroy Foster, '25, Assistant Professor in the Department of Mining Engineering, as assistant to the director of the Division of Industrial Co-operation; Richard M. Rush, '22, lieutenant commander, United States Navy, as special lecturer in Naval Architecture; H. R. Seiwel, '38, as special lecturer in Mathematics; and Walter L. Whitehead, '13, of the Department of Geology, as special lecturer in Mining Engineering. Among the resignations were those of Horace T. Mann, '25, Associate Professor in Mining; Carl Engstrom, '36, instructor in Naval Architecture; Frederic P. Fischer, '39, instructor in Electrical Engineering; and John B. Fitzgerald, instructor in Military Science.

Those added to the Institute's staff as instructors are Alfred H. Hall, technical sergeant, United States Army, and Ward B. Carroll, sergeant, United States Army, in Military Science; Edward E. Dawson, '33, in Marine Engineering; J. Martin Frissel in Architecture; Christian E. Grosser, '32, in Mechanical Engineering; Walter W. Robertson in Naval Architecture; and Philip C. Stein in Civil Engineering.

### *Fair Winds*

**S**AILING under the burgee of the M.I.T. Nautical Association continued throughout the summer, and, with the opening of the academic year, other sports

got under way, with new facilities for track and field events supplied by the fine new track and the Briggs Field House. Meantime, on the site of the old Tech Field, construction of the swimming pool goes forward.

The Institute sailors won a large share of inter-collegiate yachting honors during the summer. In June, John T. Carleton, '42, and Sumner Dean Lewis, '42, defeated crews from six local colleges in the Boston University Invitation Regatta. At the same time another crew lost to McGill University at Montreal.

Runyon Colie, Jr., '40, Herman Hanson, '39, and Robert Atwater, '39, won second place in the famous McMillan Trophy Race sailed in Atlantic Class boats on Long Island Sound. Marblehead, Mass., was the scene of a midsummer regatta in honor of midshipmen of the United States Naval Academy, visiting on their summer cruise. In competition with eight colleges, Technology won. A high honor was paid to one of the Institute's skippers, Sumner Dean Lewis, who was awarded the Leonard Munn Fowle Trophy for his distinguished performance in leading the Indian Class fleet during Marblehead's Race Week. Lewis won the series over an average starting number of thirty-two skippers.

### Henry S. Pritchett, 1857-1939

HENRY S. PRITCHETT, President of the Institute from 1900 to 1907, and for many years President of the Carnegie Foundation for the Advancement of Teaching, died on August 28 at his home in Santa Barbara, Calif. His early work in astronomy, including participation in an expedition to New Zealand to observe the transit of Venus in 1882 and a professorship at

Washington University in St. Louis, led to the position of superintendent of the United States Coast and Geodetic Survey, the post from which he came to Technology.

As first president of the Carnegie Foundation for the Advancement of Teaching, Dr. Pritchett directed the establishment of a system of pensions for teachers in colleges whose academic standards were approved by the foundation. The foundation was influential in raising the academic standards of many colleges, thus contributing to the betterment of American education in general, and its pensions have proved a boon to innumerable teachers in various parts of the country.

Born in Fayette, Mo., Dr. Pritchett spent part of his boyhood in the thick of the Civil War. His college training, which lasted ten years, started in Pritchett College, in Glasgow, Mo., and he received the degree of bachelor of arts there in 1875. Following many years as an astronomer, he was awarded the degree of doctor of philosophy in 1894 for his studies at Munich. Subsequent honorary degrees came to him from more than a score of institutions.

### A Record of Devotion

THE World War experiences and the ideals of Kenneth Weeks, '12, are the focus around which centers *Greater Love Hath No Man*.\* The book is a collection of letters written by soldiers of the French Foreign Legion, some by Weeks and his comrades, others by men who joined the ranks after his death in battle less than a

\* Boston: Humphries, 1939. xii, 237 pages, \$3.50.



Here is Technology as infrared photography sees it. Antedating the start of construction of the new swimming pool, this picture includes the Briggs Field House.

This material came from our records





F. S. Lincoln, '22

Charles Ladd Norton, '93

year from the opening of war. All the letters were written to Weeks's mother, Mrs. Alice S. Weeks, the editor of the book.

Kenneth Weeks was born in Chestnut Hill, Mass., in 1889 and very early showed talents and interests which gave promise of a brilliant artistic and literary career. The Institute was presented, after his death, with a collection of his brass rubbings, made during a stay in England when, a boy in knee breeches, he was permitted to ramble through the churches and cathedrals. He spent two years studying architecture at Technology; then, leaving for the École des beaux-arts, he attained his desire of making France his home. His literary interests soon outweighed the architectural, and before his enlistment in August, 1914, he had published several books.

His mother went to France early in the war. Experienced in relief work, she found great outlets for her energies in Paris. Gradually her residence became the home of all the Americans in the Foreign Legion, and her full time was spent in running the ever changing household, in keeping up the extensive correspondence, and in visits to the War Office and the American Embassy in behalf of the soldiers. As her "family" increased through members of the Ambulance Service and the Lafayette Escadrille, the financial burden grew heavier, and late in 1916 Mrs. Weeks returned to the United States to lecture and raise money; as a result, the Home Service was established, and she returned to Paris with the knowledge that a committee of businessmen were backing her at home.

The letters in *Greater Love Hath No Man*, most of them intimate and frank, tell an almost unique story, for the soldiers who wrote them had a strong family attachment to their home in Paris and to one another —

different characters, but possessing common interests and ideals. Tragedy is present, sometimes striking, always threatening; but present, too, are patience, humor, and all the other witnesses of courage.

### Charles Ladd Norton, 1870–1939

CHARLES LADD NORTON, '93, who for forty-six years had been a member of the Faculty of the Institute, died on September 8 at his summer home in Annisquam, Mass. He will long be remembered for his strong loyalty to all that is the Institute and for the wisdom of his counsel in shaping the course of Technology for more than four decades. He will be remembered, too, by generations of students who found in him an interested and understanding friend as well as an able and patient teacher. He was called from his teaching career to take charge of the Division of Industrial Co-operation, a post in which his admirable administrative ability and great fund of technical knowledge played an important part in the Institute's varied relationships with industry in general.

As physicist and engineer, Professor Norton worked in a wide field, and he was constantly active in the creation of new products and new processes for industry. He was associated with the late Edward Atkinson in pioneer fire-prevention work. Influential in the introduction of Portland cement concretes as material for fire-proof construction, he was the inventor of processes widely used in the manufacture of asbestos board and asbestos shingles. This last industrial contribution was perhaps his best-known invention, and the familiar asbestos materials in such widespread use today were largely the result of his research. He further developed processes for the manufacture of metallic magnesium, particularly for use during the World War.

Among Professor Norton's notable contributions to industry was a machine for making silica brick which superseded the old hand-molding method and is now in universal use. He had also contributed to knowledge of high-temperature insulating materials and was much interested in problems of corrosion in metals. Recently he had been engaged in important research on synthetic textile fibers.

Professor Norton was a pioneer in the application of x-rays to medicine and surgery in this country, and was distinguished for early investigations in this field with the late Dr. Francis H. Williams, '73, of Boston. His printed papers, beginning with "The X-Rays in Medicine and Surgery," published in 1896, range over almost the entire field of industrial physics and number more than fifty. He held over one hundred United States and foreign patents relating to the economies of heat and the diminution of fire loss, and he was a director of many corporations as well as a member of many distinguished scientific and engineering societies.

Professor Norton was born in Springfield, Mass., the son of Francis and Jennie Maria Norton. Upon his graduation from the Institute in 1893, he became a member of the staff of the Department of Physics and for the remainder of his life maintained an uninterrupted affiliation with Technology. He held at various times the posts of professor of heat measurement, professor of

industrial physics, director of the research laboratory of industrial physics, head of the Department of Physics, and member of the Administrative Committee of the Institute in 1922. Since 1921 he had been director of the Division of Industrial Co-operation.

### *Visiting Committee Reports*

CONDENSATIONS of the reports presented to the Institute's Corporation by the various Departmental Visiting Committees are published from month to month in *The Review* as interesting parts of Institute history and as significant educational documents. Recommendations or information likely to be of importance to a wide group of readers characterize those reports which are selected for this treatment. This month two such papers are offered; others will follow in succeeding issues.

#### DEPARTMENT OF ELECTRICAL ENGINEERING\*

SO far as the purely technical phases of the Department's activities are concerned, principal consideration by the Committee centered on five major items, specifically: (1) the new differential analyzer and the Center of Mathematical Analysis, (2) insulating-oil research, (3) blind landing and general ultrahigh-frequency wave propagation and utilization, (4) high-voltage x-ray work, and (5) the fundamental insulation research work under the direction of Dr. von Hippel. The general outline of work in hand or accomplished and of the program for the future commended itself to the Committee.

In blind-landing and general ultrahigh-frequency work, the field for investigation is so large and the prospects of results of extreme value are so great that the Committee recommend that the greatest support be accorded an extension of this work.

The Committee examined the new high-voltage x-ray pressure-insulated electrostatic-generator equipment now nearing completion under a subvention from the

\* Members of this Committee for 1938-1939 were Frank B. Jewett, '03, Chairman, Henry E. Warren, '94, Harry P. Charlesworth, '05, Viggo E. Bird, '08, Edward A. Deeds, Melville Eastham, and John C. Parker.

Hyams Trust. They were very much impressed by the high quality of the fundamental research and the nicety of design which had entered into the work. They were even more impressed by the importance of the whole field of work represented by this equipment. While no specific problems for additional aid or facilities were presented, the Committee venture on their own motion to recommend that the President and Executive Committee of the Institute accord utmost support if such need does exist. They are convinced that work in this field will be carried on in distinguished fashion.

Obviously, most work in electrical engineering or the physical sciences finds its direct application primarily in the realm of new or improved physical things, and affects only indirectly matters of life or health. While the blind-landing work, to some extent, is an exception to this in that it enhances materially the safety of aviation, high-voltage x-ray research of the kind now being carried on is of the utmost importance in the whole realm of medicine and of human life generally.

Three matters were gone into in detail by the Committee, namely, general undergraduate course revision, honors-group program, and English. The Committee feel that the general course-revision study, inaugurated by Professor Jackson in 1933 and now nearing completion, is highly desirable and will result in additional improvement in the already high standard of this most important function of the Department. Likewise, the Committee believe that modification of the honors-group program (in which the Electrical Engineering Department was the pioneer at the Institute), in the light of what is now a sufficiently long experience, will greatly enhance this proved scheme of instruction for a selected group of undergraduate students.

By far the most extensive and serious consideration of the Committee was concerned with English, both written and spoken. The Committee were unanimous in recognizing that proficiency in command of English was the most valuable asset an engineer could possess, since it is the only vehicle by which he can convey his technical ideas to others—particularly to non-technical people. The Committee recognized that while progress has been marked in recent years, there is always room for improvement. They realize that ad-

*Thirty-two members of M.I.T. 1909 and twenty-nine guests turned out for the thirtieth reunion of the Class at Osterville, Mass., in June.*





vance beyond what is now being done by way of instruction is a major operation involving all Departments, and, further, that in the absence of experience there is considerable question as to the best method or methods to be employed.

This being so, the Committee are strongly of the opinion that the suggestion of using the Department as an experimental laboratory be explored further and that if, in co-operation with the Department of English or otherwise, a feasible plan is found, it be supported by the President and Executive Committee. The appointment initially of a carefully selected full- or part-time editorial adviser appealed to the Committee as worthy of serious consideration. The Committee urgently recommend that this matter be actively studied by the Department and the administration of the Institute.

#### DEPARTMENT OF CHEMICAL ENGINEERING\*

THE important question of the policy to be followed in respect of the size of graduate and undergraduate enrollment was a chief topic for discussion by the Committee. The Committee feel that there will be an increasing need for chemical engineers from both the undergraduate and the graduate curricula, and that there will be an increasing demand by students for admission to these programs. As a long-range policy, the Department should meet this situation by raising its quality standards for admission and permitting only a modest increase in enrollment. Considering the present limited facilities, however, expansion of either the graduate or the undergraduate enrollment would seem unwise until better provisions for thesis research can be secured. In addition, the Committee feel that it would be desirable to extend the research activities of the Department by further appointment of assistants to aid members of the staff in research work and thesis direction. The Committee understand that these views are generally shared by the Department staff.

After considering the immediate policies to be carried out as outlined above, the Committee considered a suggestion that greater efficiency could be obtained from the teaching staff and also in the carrying out of thesis work by the graduate students if the professional work could be housed under one building. The building could be two stories high and simple in structure, the lower floor to be used for research and the upper floor to be used for offices for the teaching staff. In this way the students carrying on their thesis work would be more directly under the supervision of the staff, and it would be easy for them to consult with the staff when necessary. The building should be sufficiently large to take care of about 200 graduate students and the proportional amount of undergraduate professional activity. If such a building were designed, it might be possible to obtain funds from outside sources which have received considerable benefit from the graduates of the Chemical Engineering Course. The construction of the building was suggested by the Committee as an idea which might be carried out at some favorable future time.

\* Members of this Committee for 1938-1939 were Albert F. Sulzer, '01, Chairman, Samuel Cabot, '09, Bradley Dewey, '09, Arthur C. Dorrance, '14, Robert E. Wilson, '16, Thomas Midgley, Jr., and Gaston F. DuBois.

## THE TREND OF AFFAIRS

(Concluded from page 16)

such correlation and with essentially the same underlying philosophy of why science accomplished certain things at certain times. But in detailing the accomplishments of science in his compendium, Hogben sometimes beclouded the broad outlines — as Levy does not.

Like Hogben, Levy recognizes that science is not simply a boon to mankind but that it also offers a mighty destructive threat to civilization. Like Hogben, he is inclined to think that capitalism has run its useful course. He deplores the escapist, almost metaphysical, writings of Jeans and Eddington. In so far as he has any proposal to make, he directs science to apply its methods to the study of man and to do so forthwith lest we all be lost.

## LOOKING AHEAD IN RESEARCH

(Concluded from page 19)

Who is going to pay the bill? This applies not only to Mr. Average Citizen, but it applies also to great business enterprises and it applies to practically every governmental unit, municipal, state, and Federal. Intimately related to this question is that of taxation. What is there to be taxed further?

Both logic and experience indicate that the only true source of wealth is production, and that the only way substantially to increase production is to increase the number of desirable things which are to be produced and to employ, to an even greater extent, the forces of nature, harnessed by suitable mechanical devices, for their production. Just as I believe that a portion of the cost of war if suitably directed in research could remove many of the basic causes of war, so I believe also that a portion of the money which is being spent for relief of employment by mortgaging our future could, if properly directed toward research in the development of desirable new products and processes, provide the necessary employment and at the same time create the profits which could pay the taxes that alone can remove the enormous debt we have now incurred. This list of problems could be greatly extended if time permitted. We have problems of safety and security, opportunity for education and recreation, and many others. To all of these, science has a contribution to make, as it has demonstrated.

The most fitting conclusion to this commentary is a quotation from Pasteur which bears directly upon the thoughts and the problems of our present generation: "In our century science is the soul of the prosperity of nations and the living source of all progress. Undoubtedly the tiring discussions of politics seem to be our guide. Empty appearances! What really leads us forward is a few scientific discoveries and their application."

Dr. Compton's address before the American Chemical Society, from which this article is drawn, appears also in *Industrial and Engineering Chemistry* for October.

# IT'S A THRIFTY THING... THE TELEPHONE



Americans have the world's best bargain in telephone service. It's good and it's cheap. Nowhere else do people get so much service and such good and courteous service at such low cost.

## THRIFTY

According to Webster, *thrifty* means "...Evinces thrift... Characterized by economy and good management... Serviceable; useful..."

BELL TELEPHONE SYSTEM





## HISTORIC YELLOW JACK

(Continued from page 21)

Soon it became evident that certain circumstances were almost always present before or during an epidemic of yellow fever. Probably these were best summarized at an early date in the publishing of the *Repository* by Dr. William Baker in an official report to the police inspector of New York City. He pointed out that yellow fever appeared only in populous towns, that it usually appeared first near the docks, that the fringes of the towns and the country were not troubled by the disease, that it was a hot-weather disease, that the pestilence was not communicated from person to person, and that dry, cool weather ended the epidemics.

In 1801 in New York City appeared an epidemic which gave clues to many of the peculiarities of yellow fever. As reported by Dr. Felix Pascalis in the *Repository* of the same year, this epidemic was confined to an area within a few blocks of what was called the Old Slip on East River. Well over half of the cases appeared in a single block adjacent to the slip, as is illustrated by the map on page 21, reproduced from Dr. Pascalis' article, "Observations on Yellow Fever." This fact suggested strongly that the disease had originated in the slip, and since there was a very disagreeable odor from the rotting piles and decaying animal and vegetable matter in the vicinity, the disease was suspected to have been caused by these odors.

To these observable circumstances medical minds of the period began to add a few imagined circumstances and so to construct many theories about the origin of the disease. In the early stages of the investigation, there was a marked tendency toward belief in rather abstract sources, which may best be characterized by the word "exhalation," which was used frequently during the early reports of the epidemics. The foul smells of stagnant swamps, dock filth, sewerage, feces, stale air in the holds of ships, and rotting substances of all kinds were believed to carry with them an influence in some way harmful to the body. Later on, the notions of origin became a little less abstract and began to focus on a theory of "poisons." The substances on which blame for the disease had earlier been laid were not acquitted but rather were interpreted as having a poisonous nature such that they could impart poison to the air in the form of an "aerial poison," miasma, or septic gas. It was fashionable also to play with the idea of spontaneous generation but not to avow it too strongly. From our present knowledge of the role of the mosquito, it is significant that from the very start the evils of stagnant water were admitted by all, although general belief was that the water must contain some foreign matter — animal, vegetable, or mineral — in order to be harmful.

To justify such theories about the origin of yellow fever, it was only reasonable to take at least a wild guess at the operation of the disease within the body. Theories of such operations were many and varied because the subject was still highly speculative. Outstanding and most widely accepted, however, was the one-fever theory, which was based on the assumption that all physical disorders accompanied by fever had an origin

in the same "remote cause," and that the varying severity of the symptoms of the different fevers depended upon the degree of noxiousness of the exhalations or the potency of the poison from which the patient derived his particular case. This idea led the same early observers to the conclusion that no fever existed as a sharply defined entity with characteristic symptoms, but that such terms as yellow fever, typhus fever, scarlet fever, merely designated roughly a region in the fever scale.

Another school contended that all people who stepped within the radius of the poisonous effect of the evil source of the pestilence took into their systems, by way of either the respiratory system or the skin, an amount of the poisonous matter sufficient to cause the disease, but that a person did not take the disease unless there was some "exciting cause," such as low mental or physical resistance. A lesser theory, forwarded by Dr. Pascalis, who was at one time editor of the *Repository*, was that the poison was generated within the body when the person had eaten the necessary foods (particularly meat) and was in the proper physical and mental condition to allow such a generation. A similar theory, which was first suggested by Dr. Benjamin Rush and adopted by some of his older contemporaries, held that the presence of lean meat in the diet, plus the imbibing of too much alcoholic drink, caused the manufacture of "septon" in the system, and that the septon acted as a poison which the system would have to overcome if it were to become healthy again.

Of course there were other theories of the operation of yellow fever, as well as many which combined parts of the foregoing. All of them were fruitless as ways of dictating a means of cure and prevention, but all were no doubt helpful in the general advance toward the eventual conquering of the disease, because they prevented these men from feeling that the case was hopeless and from giving up the baffling matter in despair. Furthermore, they were the basis of a number of methods of treatment which did much to alleviate the pestilence and, without question, prevented many a death.

In the early days many remedies were being tried for yellow fever; among them were bleeding, emetics, and laxatives and tonics derived from a number of herbs and barks, some of which had been passed down from the ancients. Some of these remedies were effective and some were as bad as the disease itself.

Dr. Rush, for many years the occupant of the important chair of the theory and practice of physic at the University of Pennsylvania, was the greatest figure in the American medical picture during the period of the *Repository*. His major remedy for yellow fever, and likewise for almost all diseases, was bloodletting. He averaged ten ounces to a bleeding and then repeated the treatment if improvement was not forthcoming. Often he took more than this at a bleeding, especially when the malady was severe, as was yellow fever, and he was even willing, so it is said, to draw as much as four-fifths of the blood from a patient's body. In spite of his great prestige as a teacher and an authority on medicine, many of his contemporaries criticized him for excessive use of the lancet; but he answered his opponents with the claim that it worked in (Continued on page 36)



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## HISTORIC YELLOW JACK

(Continued from page 34)

practice, and indeed it often seemed to do so. The greatest test of his method came during the 1793 epidemic of yellow fever at Philadelphia, where he was practicing and teaching. He stuck by his patients through the dreadful summer, bleeding right and left, sometimes believing himself to be afflicted with the malady and then applying his own remedy to himself with confidence and fearlessness. In a lengthy paper which followed and summarized his experiences in the epidemic, he claimed that when bleeding was resorted to early enough in the progress of the malady, it seldom failed to produce favorable results. So great did his success appear to be that many practitioners were won over to his methods in spite of the gradual tendency to abandon bleeding as a stock remedy.

Calomel as a laxative was then generally accepted in the treatment of all ills, and its use was experimented upon in the treatment of yellow fever with varying degrees of observable success. For the same reason that bleeding was employed — to reduce feverishness — some of the doctors administered a cold bath in the early stages of the disease. As the early experimentation advanced, the trend seemed to be away from the administering of a large number of palliatives en masse and toward the attempt to find one or two that really did the curing.

From the *Repository* we learn that when methods of preventing the return of epidemics of yellow fever were considered, the keynote was usually the adoption of rules of cleanliness in the cities and, in many cases, the securing of better ventilation. Perhaps the idea of cleanliness came from the unconscious belief that everything uncomfortable to the human sense organs must be suspected of causing disease and pestilence. It seems a pity and a wonder that a warning was not taken from the uncomfortable sting of the mosquito.

A certain number of doctors advocated moderation in eating, drinking, exercise, and all the activities of man as a method of maintaining protection against yellow fever. Dr. Samuel L. Mitchill, whose versatility extended to medicine, politics, geology, chemistry, and many other fields and who was one of the major editors of the *Repository*, was a champion of the theory of alkalization to prevent yellow fever. His belief arose from the notion that all the poisons which were supposed to cause yellow fever were acidic in nature and that they could be rendered harmless by being neutralized by some alkali. Dr. Mitchill went as far as to recommend to the authorities of the city of New York a law requiring that the streets be paved with limestone and as many buildings as possible be made of limestone, so that, as he believed, the natural alkaline rock would absorb the acids of disease. Again, during an epidemic in Baltimore, Md., in 1819, the mayor ordered lime to be strewn about on the ground near the place where the pestilence had first appeared. The report is that the epidemic stopped for two months.

When the last volume of the *Repository* was published in 1824, the fight against yellow fever was hardly more than begun. But by this time (Concluded on page 38)

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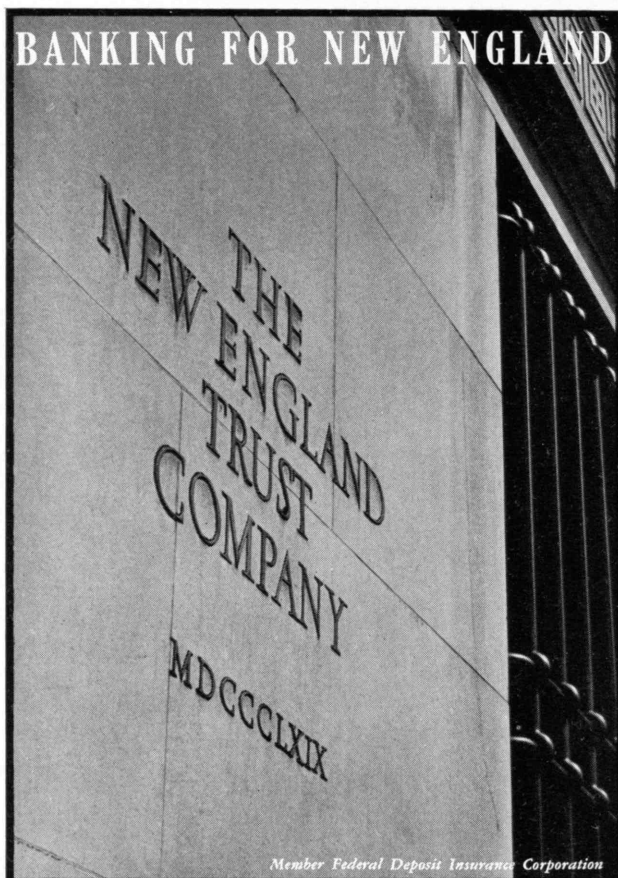
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## HISTORIC YELLOW JACK

*(Concluded from page 36)*

many other medical journals had arisen to take the place of the *Repository*, and many cities had organized public-health agencies to cope with yellow fever and other diseases. Nevertheless, doctors were to swap notes for the remainder of the century before the means by which the disease was transmitted could be unearthed and measures of control devised. One of the great arguments was whether or not yellow fever could be imported from abroad and, therefore, whether or not quarantine of ships was necessary. For a long time the doctors seemed to be about equally divided, some believing that the disease came here with cargoes from the West Indies or from Africa, others thoroughly convinced that its origin was entirely indigenous. As a matter of fact, yellow fever probably came to North America on slave ships from Africa. Apparently it served as a great and unsuspected punishment of some of our liberty-loving ancestors who, nevertheless, had little respect for the rights of their black cousins.

Not until the beginning of the Nineteenth Century was the operation of the disease disclosed and its course brought toward an end through the well-known methods of mosquito control. The monumental work of Dr. Walter Reed and his immediate predecessors has earned a rightful place in the history of American public health. But this final burst of success in the control of yellow fever might be compared to the colorful bloom of a plant whose roots were deeply imbedded in factual soil which had been laid in place year by year through the work of a centuryful of American doctors.

## ULTIMATE AND INDIVISIBLE

*(Continued from page 23)*

photon. Every atom of every chemical element has its outer structure built of electrons arranged in concentric "shells" about its central nucleus. Actually, in point of bulk, electrons make up nearly all of the atom, though most of the weight is in the central nucleus. The number of extranuclear electrons, particularly the number in the outermost shell, determines the chemical properties of

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the atom. The regularity of the arrangement of shells is the fundamental cause of the regularity exhibited in the famous periodic table of the chemical elements.

Each electron has an electric charge amounting to about 0.000000 000000 00000016 coulomb of negative electricity. Electrons are held in the atom by attraction for the positively charged nucleus, and the atoms in many molecules and crystals are held together by these same electrical forces. Though a chemist might not like the definition, one could say that chemistry is the investigation of the idiosyncrasies of the outer electronic shells of atoms and molecules.

Since light waves have turned out to be partly corpuscular, we might guess that electrons might turn out to be part wave, and indeed they do so. The laws governing the motions of electrons are somewhat similar to the wave laws governing photons, though they exhibit also a similarity to the laws governing "actual" particles. The wave properties of electron streams — such as interference — have often been observed and are the basis of the electron-diffraction technique for analyzing the structure of surfaces and films.

In addition to mass and electric charge, the electron has an axis. This property is ordinarily spoken of as spin, because an axis usually implies rotation. The most obvious manifestation of this property is the magnetization of the electron, and it can most easily be measured by magnetic means. Actually the presence of the axis is due to a warping predicted by the theory of relativity. P. A. M. Dirac, the brilliant young English physicist, showed how the wave equations for the electron could be set up to take into account the contraction which relativity requires for moving objects, and showed that the new equations predicted a spin and magnetic properties of just the sort observed.

But the equations did not stop here; to everyone's embarrassment they went on predicting. Dirac rather apologetically showed that they predicted a curious sort of dualism for the electron. In addition to the negatively charged electron, there should also be a particle having the same mass as the electron but having a positive electric charge. True, this particle should not be very permanent, for the equations predicted it could combine with an electron, destroying both itself and the electron and sending out short-wave photons with an energy of about a million volts. Nevertheless, the calculations also indicated that the curious particle could sometimes be formed, along with an electron twin, by the collision of an atomic nucleus and a photon of sufficiently large energy. Such was the prediction, and since no such particles were then known, either the equations were at fault or else we had not looked carefully enough for the new particle.

In 1932 Carl Anderson at the California Institute of Technology discovered the new particle, so apologetically predicted by Dirac, and christened it the *positron*. Both Dirac and Anderson received Nobel prizes for their work. Since then, positrons have been observed in numerous experiments, and many of their properties are known. The positron has the same mass and spin as does an electron, and its electric charge is equal in magnitude but opposite in sign. There is somewhat of Greek tragedy in the relation between (Continued on page 40)

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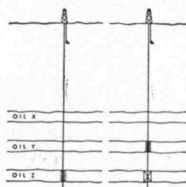


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## ULTIMATE AND INDIVISIBLE

*(Continued from page 39)*

electron and positron, for though they can be born together from the same photon, they destroy each other when they meet, ending in another photon. A universe created with equal numbers of electrons and positrons would not last long. Luckily, in our universe there is an excess of electrons, and these survive in relative peace among their fellows. When an occasional positron is created, it finds itself in an unfriendly world, doomed to destruction at its first encounter with an electron.

Outside the atomic nucleus, therefore, only two kinds of particles carry on the work of nature: Electrons, in their possible groupings and reactions, are responsible for the phenomena of chemistry; photons carry the messages of change from atom to atom. Occasionally an ill-starred positron makes its appearance, only to disappear again.

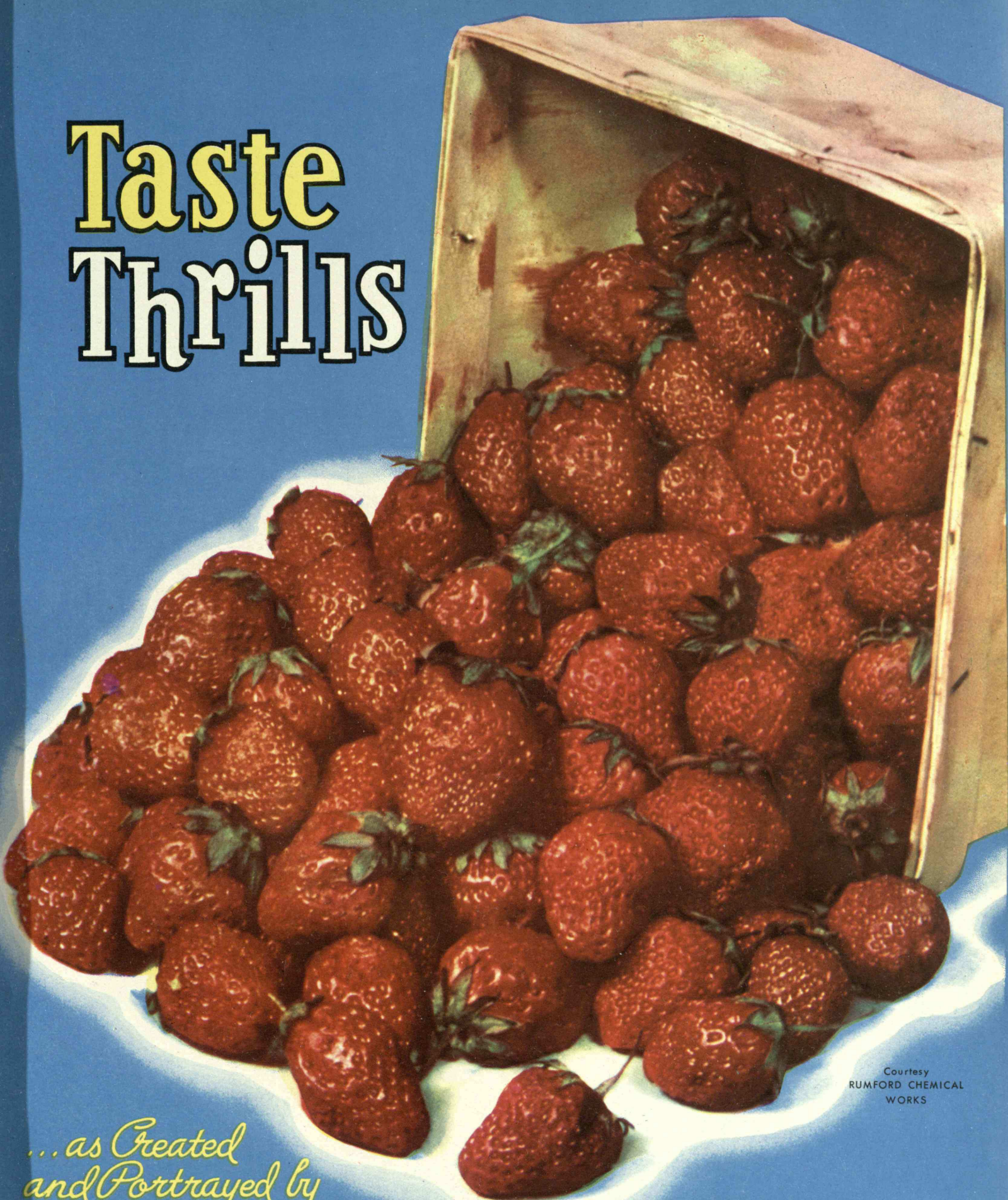
For some time no such simplicity seemed to rule the structure of the inner atomic nucleus, the heavy central part of each atom. There seemed to be ninety-two different particles (one for each chemical element), all heavier than the electron, all much smaller in size than the whole atom, and all positively charged, but each having a different mass and a different amount of charge. This nuclear charge determines how many electrons the nucleus can hold about it and therefore determines the chemical behavior of the resulting atom. Naturally this charge is an integral multiple of the electronic charge, with the opposite sign; otherwise the atom could not be electrically neutral. This integer, which equals the number of extranuclear electrons in the resulting atom, is called the atomic number of the nucleus or atom. The mass of the lightest nucleus, that of hydrogen, is almost two thousand times that of the electron, and the masses of other nuclei are still larger, in proportion to their atomic weight.

How these ninety-two nuclei could be built out of a few kinds of elementary particles was hard to see. Of course, a few of the heavier nuclei (the radioactive ones) occasionally exploded, sending off simpler fragments: electrons or photons or nuclei of helium atoms (called alpha particles). But it did not seem possible that nuclei were built out of these alone. In the first place, the famous Dirac equations did not provide for an electron's cooping itself up inside a nucleus. Of course the equations, even though they explained spin and had predicted the positron, might not be correct. However, other difficulties arose.

Nuclei were weighed by means of the mass spectrograph, where they are centrifuged against a magnetic field, and it developed that many more than ninety-two kinds of nuclei exist. Nuclei of the same chemical element (having the same number of unit charges and so the same atomic number) were found to have different masses (atomic weights), though the masses all turned out to be approximately an integer times the mass of the lightest nucleus (that of hydrogen). Nuclei of the same atomic weight were found to have different atomic numbers. Even the nuclei of the lightest element, hydrogen (atomic number equal to 1), were found to be not all the same, most of them *(Continued on page 41)*



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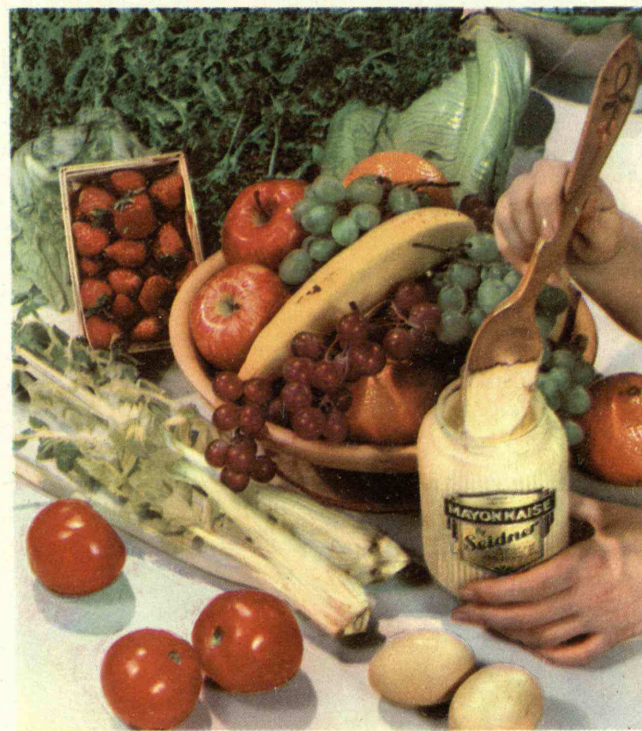


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## ULTIMATE AND INDIVISIBLE

(Continued from page 40)

having unit atomic weight (these nuclei are called *protons*), but a few having atomic weight 2 (these are called *deuterons*). Ten different kinds of nuclei of the element tin, atomic number 50, are known, having atomic weights which range from 112 to 124. The atomic weight for tin reported by the chemist is, of course, the average weight for the particular mixture of the ten different kinds of nuclei found in nature. This mixture is the usual tin, and its constituent species cannot be segregated by chemical means, since they differ only in mass and are identical chemically. At least three different kinds of nuclei have atomic weight 130: one nucleus of barium, atomic number 56; one of xenon, 54; and one of tellurium, 52. At present about 300 different kinds of stable nuclei are known. For a time any hope of simplicity and economy in nuclear building blocks was illusory.

The discovery of still other nuclei, created by high-voltage bombardment, seemed at first to add more complication to the picture. Most of these new nuclei were found to be unstable, shooting off an unwanted particle or so before becoming normal and well behaved. The particles from some of these artificially radioactive nuclei are electrons, those from others are photons, some are protons, some are deuterons, and some even are positrons. In addition to this profusion of known kinds of particles, the French worker Joliot and his wife (Mme Curie's daughter) turned up a new type. Its habits were intensively studied by the English scientist Chadwick and his group, and by them it was named the *neutron*. The Joliot and Chadwick have since been awarded Nobel prizes.

Compared to the electron, the neutron is a heavy particle; in fact it is almost exactly the same weight as the proton, the hydrogen nucleus of unit atomic weight. The neutron, however, has no electric charge — a lack which makes it much more difficult to control and measure than a charged particle. Its habits have been observed now for seven years, and it has proved a quite useful tool in the study of nuclear reactions.

Soon after the discovery of the neutron, simplicity came back to the nuclear picture. All nuclei were proved to be built of neutrons and protons. The number of protons in a nucleus equals its atomic number, since each proton carries a unit positive charge; the total number of protons and neutrons equals its atomic weight. Thus the yearned-for simplicity was demonstrated at last.

The neutron and the proton are the heavyweight pair of elementary particles, being about 1,840 times more massive than an electron or a positron. The proton has an electric charge equal to that on the positron; the neutron has no charge. Both have spins which are equal in magnitude but differ in magnetic effects. The relation between the two particles is not so close as the curious blend of identity and opposition which the positron and electron display. The neutron is about .08 per cent heavier than the proton; when the two combine, they do not vanish but produce a deuteron, the nucleus of heavy hydrogen. When a neutron is in a nucleus which is bombarded by high-speed particles, (Continued on page 42)

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## ULTIMATE AND INDIVISIBLE

(Continued from page 41)

it can sometimes pick up enough energy from the bombardment to change into a proton, giving off an electron; similarly a proton, under the same conditions, can turn into a neutron by shooting off a positron. Occasionally also a proton can change into a neutron by absorbing an electron and giving up the resulting energy in the form of a photon. A neutron, however, is not to be considered a combination of a proton and an electron, nor is a proton to be considered a neutron plus a positron. When a heavy particle changes its nature, it creates an electron or positron to carry off the excess electric charge, just as an extranuclear electron creates a photon of light to carry off its excess energy.

Neutrons and protons cling very tightly together inside nuclei, and the forces binding them together are exceedingly powerful but very short in range. When the particles are only 0.000000 0000001 centimeter apart (about the size of a nucleus), these forces are several million times the ordinary electrical forces holding the extranuclear electrons in their outer shells. As the distance between particles is increased, the nuclear forces diminish much more rapidly than do the electrical forces; by the time the particles are separated a distance equal to the size of an atom (several thousand times nuclear size), these nonelectrical forces are negligible. At atomic distances there is practically no force between two neutrons or between a neutron and a proton; there is the usual electrical repulsion between a proton and another proton. Our knowledge of nuclear forces has to a great extent been deduced from measurements of the ricochet of very high-speed protons and neutrons off proton (i.e., hydrogen) targets. Much experimental work needs to be done before the nature and details of these forces can be made clear.

These five fundamental particles — the photon, the carrier of electromagnetic energy; the electron and positron, the pair of lightweight particles; and the neutron and proton, the heavy pair — have been studied so long and by so many different workers that we are fairly sure they "exist" and we know their major idiosyncrasies. There are a few other more elusive entities whose existence seems likely to be proved experimentally but whose properties are only fragmentarily known.

Some evidence seems to indicate that when a neutron is transformed into a proton, another particle is given off in addition to the electron. This other particle has been called a *neutrino*. The Italian physicist Fermi (another Nobel prize winner, now living in this country) developed a theory of this transformation which predicted the existence of such a particle and indicated that it should have no electric charge but should possess a spin and have a mass much smaller than an electron. Such particles would be quite difficult to detect, and at present only one set of experiments seems to prove their existence.

Several years ago the Japanese physicist Yukawa studied the theory of the nonelectrical forces between nuclear particles and showed that a corpuscle of radiation might be associated with these forces,



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just as the photon of light is associated with electrical forces. His studies could not determine whether the predicted particle had spin or electric charge, and his paper ends on an apologetic note after he calculates that the particle should weigh about a hundred times the electronic mass, or about  $\frac{1}{20}$  the proton mass. A few recent observations of the constituents of cosmic rays seem to indicate that this intermediate particle actually does exist. It has been called the *meson*, or *mesotron*.

Thus Democritus' conception of the economy of nature in its use of building materials for the universe seems to be finally demonstrated, although the picture is not so simple as one might hope. Two kinds of particles, protons and neutrons, make up all atomic nuclei; one other kind, the electron, makes up the outer structure and completes the atom as chemists know it. There is the ephemeral positron, closely related to the electron, and there is the photon, which carries electromagnetic energy. There are, in addition, possibly the elusive neutrino and the welterweight meson. None of these particles is indestructible: Electrons and positrons can vanish, protons can change to neutrons, and so on. Total electrical charge cannot change during these transformations, but mass can be converted into energy, and vice versa.

The amazing feat of Dirac in predicting the positron before its discovery, and the possibly successful prophecies of Fermi and Yukawa concerning the neutrino and the meson, constitute a heartening victory for the modern quantum theory. Neverthe- (Concluded on page 44)

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No. 79

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## ULTIMATE AND INDIVISIBLE

(Concluded from page 43)

less it is dangerous to become overconfident in the infallibility of purely theoretical analysis and so to neglect experimental science. Many other predictions made during the past ten years have been proved wrong. No theory, no matter how beautiful its equations, has any more value than Democritus' original speculation until its predictions have been verified by the hard-boiled experimenters. We still need scientists from Missouri.

## CHEMIST AND CRIME

(Continued from page 26)

Another example was the case of two drivers who blamed each other for the death of a pedestrian. Examination of the cars and location of evidence on them cleared one driver and laid the blame on the other. In other cases, bloodstains have been shown to be animal, not human; or supposed bloodstains have been shown to be paint. In the course of months these exonerations occur, to be forgotten soon by everyone except the individuals cleared.

All the foregoing cases might be termed police cases, in contrast to the numerous other cases where the material to be analyzed comes from the medical examiner. These latter cases are ones which involve toxicology. Outstanding in them is the question of alcohol. This element enters all types of cases: accident, suicide, murder. The routine course is to analyze the brain, blood, urine, and stomach contents of the deceased. In those instances where the story is clear, the analysis may be confined to the blood only. In some of the cases, alcohol is merely an accompanying factor; in others, it may satisfactorily explain many questions. For example, there was the case of the window washer who worked without a safety belt and fell. Why? Alcohol. When walking on the ground he probably felt he had perfect control; but with precarious footing some seventy feet in the air, a quarter-inch miss is as fatal as one of a foot. Many motor accidents have comparable causes. A little alcohol, producing rashness of judgment and a slight loss of control — perhaps not obvious, but a little too much for success in quick thinking and muscle response — leads to a crash, perhaps to a death.

Another large group of cases are those involving carbon monoxide poisoning. Traditional tales tell of the discovery of a charred dead body showing no carbon monoxide. This lack was regarded as evidence of murder. Yet in a recent case the finding of an adequate amount of carbon monoxide in the blood of the deceased showed that the man was alive when gasoline was poured over him and set afire. On the other hand,

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cases come in which because they involve fire are supposedly carbon monoxide deaths but which arouse suspicion because they show only a mere trace of carbon monoxide in the blood. Murder? Not always. The chemist must search for some other factor adequate for death. In some cases this other factor has been alcohol; in one it was a drug taken with apparent suicidal intent. The fires were accidental, starting after the individuals had become unconscious. These suspicious cases always mean extra work and a thorough investigation of circumstances, conditions, and all possible connections to make certain that death was not caused by murder.

Accidents, too, are a common source of work for the police chemist. There is the person who pours a drink blindly, discovering too late that it was a generous measure of concentrated acid. Or perhaps it was cleaning fluid. Wood alcohol has been mistaken for gin on occasion. Roach powder has been used as a seasoner for fish, as baking powder for pancakes, and as a cathartic instead of Epsom salts. Victims of such carelessness arrive dead, leaving to the medical examiner and toxicologist the job of unraveling the mystery of why the gin tasted bad, the fish was no good, the pancakes gave the diners a stomach-ache, and the Epsom salts made the cramps worse. At times blame is wrongly placed on some industrial concern or food packer, and attorneys are employed to start suit. To ascertain the correct cause of death is essential, and in these cases the medical examiner's report, which includes that of the toxicologist, stops court suits before they get thoroughly under way.

Murder by poison requires that the analyst identify the particular poison which caused death, and analyze enough of the organs to be able to show that a lethal amount had been ingested by the deceased. When a competent medical examiner makes the post-mortem

examination, the chemist usually receives sufficient indication of the probable agent for the task of identification to be relatively simple. In other cases, there may be indication of poison but no clean-cut picture. The chemist or toxicologist then begins a routine search for the agent.

In principle, toxicology is not unlike the everyday chemistry of the classroom. Poisons may be roughly subdivided into the following groups: volatile poisons, such as the alcohols, cyanides, phosphorus; synthetic hypnotics and alkaloids; the metals; gases; and, finally, a number of miscellaneous agents such as acids and alkalis, classed as separate or special methods. Volatile poisons are separated from the tissues usually by steam distillation; the synthetic hypnotics and alkaloids, by extraction; the metals, by digestion of the tissue with acids until the tissue becomes fluid. The others require particular methods according to their nature. After this basic classification has been made, each group must be examined for the specific agent. The primary difficulty lies in the fact that the amount of poison present may be very small, and this small quantity may be distributed through the body. Some poisons show a selective distribution, being found in concentration in certain parts of the body; others have a general distribution. In a case where one-third of a gram of a poison is distributed through a 125-pound body, the chemist naturally feels quite content to find from one-third to one milligram per hundred grams of tissue.

To many the chemist may seem to have completed his task when he makes his analysis of the material submitted. That is not true. One of his primary functions is to develop points of evidence useful in convicting the criminal. To complete that function he must take the witness stand. Before the trial starts, he must go over his reports with the district (*Concluded on page 46*)

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## CHEMIST AND CRIME

(Concluded from page 45)

attorney, making certain that the nature of the evidence and its development to a logical conclusion are clear to the district attorney. A jury, it must be remembered, is composed not of technically trained experts but of laymen; so all statements must be made perfectly clear and understandable. To do so is not always easy to one accustomed to thinking in technical terms, and in a complicated problem the conference with the district attorney may take considerable time.

Once the trial has started, the chemist must be prepared to pick up, and work on, any new elements which may be introduced. At the proper time he takes the stand himself. His cross-examination may be brief, or may last for a full court day or longer. It is an ordeal which many men not only dislike but fear — a six- or eight-hour oral examination in which the witness can only answer questions; in which every word is taken down in shorthand and may be referred to in two, five, or ten years' time; in which the questioner is not impartial but seeks to show the witness to be wrong in some result or opinion. Later, if defense places corresponding experts upon the stand, the police chemist must be present and listen critically to all that is said in direct examination, so that he may advise the district attorney of weak spots for cross-examination. If need be, he must take the stand again in rebuttal. Until a verdict has been returned, he is not wholly free.

New cases come in constantly, and reviews of them could be continued indefinitely, but the few presented here show a fair picture of the chemist's part in criminal investigation. He must be an expert chemist and also a scientific jack-of-all-trades; he must rely on a dozen special units and co-operate with them; he must have the imagination necessary to develop evidence and its connections, with the patience necessary to develop proof of these connections; he must be able to translate highly technical work into simple terms understandable to the lay jury; and he must have common sense.

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CHECK LIST OF THE ACTIVITIES AND ACHIEVEMENTS OF M.I.T. ALUMNI, OFFICERS, AND STUDENTS

## Honors: Degrees and Such

✓ [ For EDWARD R. WARREN '81, an honorary doctor of science degree from Colorado College.

✓ [ For RICHARD S. LULL '85, the Daniel Giraud Elliot Medal for his monograph on "The Horned Dinosauria or Ceratopsia."

[ For GEORGE A. CAMPBELL '91, the Elliott Cresson Medal for distinguished contributions in physical science.

✓ [ For Forbes Lithograph Manufacturing Company, of which WILLIAM S. FORBES '93 is president, a citation from the Engineering Societies of New England, Inc., for the Sebrot process of making posters.

✓ [ For WILLIAM D. COOLIDGE '96, the Faraday Medal, awarded for "notable scientific and industrial achievement in electrical engineering."

✓ [ For CHARLES G. HYDE '96, honorary membership in the American Water Works Association.

✓ [ For JAMES M. BARKER '07, an honorary degree from Middlebury College.

✓ [ For CHARLES A. KRAUS '08, a doctorate of laws from Colgate University.

✓ [ For THOMAS C. DESMOND '09, an honorary degree of doctor of humane letters from Union College.

✓ [ For JOHN T. ARMS '11, the honorary degree of master of arts from Wesleyan University.

✓ [ For ROBERT E. WILSON '16, the Chemical Industry Medal of the Society of Chemical Industry, for valuable application of chemical research to industry.

✓ [ For ROBERT S. MULLIKEN '17, an honorary doctor of science degree from Columbia University.

✓ [ For CLAIR E. TURNER '17, election to associate fellowship in the American Academy of Physical Education.

✓ [ For SAMUEL V. CHAMBERLAIN '18, an associateship in the National Academy of Design.

✓ [ For ARTHUR C. HARDY '18, an Edward Longstreth Medal for the encouragement of invention, presented by the Franklin Institute.

[ For ERIC HODGINS '22, an honorary doctor of letters from Bates College.

[ For EDWARD D. STONE '27, a third prize in the Smithsonian Gallery of Art Competition.

[ For SIDNEY B. WAUGH '27, an honorary master's degree from Amherst. Mr. Waugh was brought into national prominence this summer when the September 18 edition of *Life* carried two pages of illustrations of his beautiful glassware.

[ For JAMES E. B. WALKER '32, one of eight Edward Langley Scholarships for advanced study, travel, and research in architecture.

[ For HARRIS A. KEMP '37, first prize in the competition to design a house with maximum cubage of 24,000 cubic feet, meeting needs of a family of four and displaying appropriate use of glass block. This competition was sponsored by the Owens-Illinois Glass Company and conducted by the *Architectural Forum*. WILLIAM V. KAESER '32 won a third prize.

[ For A. RICHARD WILLIAMS '37, an Edward Langley Scholarship from the American Institute of Architects.

✓ [ For WILLIAM EMERSON, Professor of Architecture, Emeritus, an honorary doctor of arts from Harvard University.

✓ [ For GEORGE R. HARRISON, Professor of Physics, the Rumford Medals of the American Academy of Arts and Sciences, in recognition of "his notable work in spectrum photometry and spectrum analysis."

## Written

✓ [ By C. FRANK ALLEN '72, "Seventy Years an Engineer," *Civil Engineering*, July.

[ By EDMUND SHAW '92, "Washing-Classifying Sand," in two parts, *Rock Products*, May and June.

[ By CHARLES M. SPOFFORD '93, "Simple Arch Roof for Boston Skating Rink," *Engineering News-Record*, August 31.

[ By GERARD H. MATTHES '95, "Observational Versus Experimental Hydraulics," *Civil Engineering*, July.

✓ [ By CHARLES E. SMITH '00, a paper on the New York, New Haven and Hartford Railroad included in a collection entitled, "Flood and Hurricane Destruction and Rehabilitation of New England Railroads."

[ By CARL J. TRAUERMAN '07, "Montana To Prosper From New Silver Profit," *Mining and Machinery Journal*, August.

[ By KARL R. KENNISON '08, "Pressure Aqueduct for Boston," *Engineering News-Record*, August 31.

[ By EDWARD P. CHAPMAN '09, "Newly Recognized Features of Mineral Paragenesis at Leadville, Colorado," *Mining Technology*, September.

[ By HIRAM E. BEEBE '10, a monthly column entitled, "President's Corner," *North and South Dakota Horticulture*.

[ By CHARLES E. GREENE '10, "Mechanical Equipment for Refuse Incinerators," *Boston Society of Civil Engineers Journal*, July.

[ By JOHN A. ALLAN '12, "Cambrian in the Vicinity of Sunwapta Pass, Jasper Park, Alberta," *Transactions, Royal Society of Canada*, Volume XXXII.

[ By TENNEY L. DAVIS '13 and Chao Yün-Ts'ung, "An Alchemical Poem by Kao Hsiang-Hsien," *Isis*, May.

[ By LOUIS W. CURRIER '14, "Co-operative geologic work in Massachusetts" (mimeographed), Department of Public Works, Boston, Mass.

[ By JAMES A. TOBEY '15, the 1939 edition of "Public Health Law," The Commonwealth Fund.

[ By MURRAY P. HORWOOD '16, "An Evaluation of the Factors Responsible for Public Health Progress in the United States," *Science*, June 9.

[ By J. SPOTTS McDOWELL '16, "Refractories in Non-Ferrous Metallurgical Furnaces," *Mining Congress Journal*, May; "Sprung-Arch Roofs For High Temperature Furnaces," *Blast Furnace and Steel Plant*, June.

[ By L. GERSTLE MACK '16, "Toulouse-Lautrec," Cape, London.

[ By ELMER E. LEGGE '18, "The Industrial Application of Austempering," *Metal and Alloys*, August.

[ By ERNEST H. HUNTRESS '20, "Problems in Organic Chemistry," McGraw-Hill.

[ By CHARLES E. RUBY '20, "Patents for Acts of Nature," *Scienco*, April 28; reprinted in *Journal of the Patent Office Society*, July.

[ By PHILIP W. CLARK '21, "The Ratproofing of New Ships," United States Government Printing Office.

[ By DAVID O. WOODBURY '21, "The Glass Giant of Palomar," Dodd, Mead; "Earthquakes Need Not Kill," *Scientific American*, August.

[ By PETE V. MARTIN '23, "Effect of the Solution-loss Reactions on Blast-furnace Efficiency," *Metals Technology*, September.

[ By JOHN D. RATCLIFF '25, "Modern Miracle Men," Dodd, Mead.



¶ By CYRIL S. SMITH '26, "A Simple Method of Thermal Analysis Permitting Quantitative Measurements of Specific and Latent Heats," *Metals Technology*, September.

¶ By BERNARD E. PROCTOR '24, "Research Perspectives in New England Food Industries," *Industry*, April.

¶ By CHARLES H. BLAKE '25, "The Flight of Hummingbirds," *New England Naturalist*, June. HAROLD E. EDGERTON '27 took the photographs which illustrate this article. The same issue of the magazine contains photographs by HENRY B. KANE '24.

¶ By ARTHUR W. BAKER '26, "Coal Mining 100 Years Ago," pictures and descriptions based on "The Playbook of Metals" by John H. Pepper, running serially, *Explosives Engineer*, beginning in April.

¶ By HUNTER ROUSE '29 and George H. Otto, "Wind Tunnel Classifier for Sand and Silt," *Civil Engineering*, July.

¶ By WILLIAM E. YELLAND '30, "A Photomicrographic Method for Determination of Warp Size Distribution on Viscose Rayon," *Textile Research*, June.

¶ By S. QUIMBY DUNTLEY '33 and Edward A. Edwards, "An Analysis of Skin Pigment Changes after Exposure to Sunlight," *Science*, September 8.

¶ By WESLEY H. LOOMIS, 3d, '35, "The Communications Exhibit," *Telephony*, May.

¶ By ROBERT P. BIGELOW, Emeritus, a revision of Sedgwick (Former Staff) and Tyler's ('84) "A Short History of Science," Macmillan.

¶ By GEORGE R. HARRISON, "Atoms in Action," Morrow; "Eyes That See Through Atoms," in two parts, *Scientific American*, September and October; as director of the staff members of the spectroscopy laboratory at M.I.T., assisted by the Works Progress Administration, "Wavelength Tables," Wiley and The Technology Press.

¶ By CARYL P. HASKINS, Research Associate, "Of Ants and Men," Prentice-Hall.

¶ By CHARLES R. HOOK, Corporation, "A Constructive Industrial Relations Program," Ohio State University Studies, Engineering Series, March.

¶ By DUGALD C. JACKSON, Emeritus, "Elihu Thomson: Electrical Engineer," *Electrical Engineering*, June.

¶ By HEINRICH PETERS, Staff, and J. P. den Hartog, editors, the papers presented at the Fifth International Congress for Applied Mechanics, which was held in Cambridge in 1938, Wiley.

¶ By HERVEY W. SHIMER, Staff, "Expanding Consciousness and Democracy," *Science*, April 14.

¶ By WILLIAM H. TIMBIE, Staff, revision of "Essentials of Alternating Currents," Wiley.

### *American Chemical Society*

¶ Held in Boston in September, the meeting of this society was well supported by Technology. ERNEST H. HUNTRESS '20, as head of the Northeastern section, was vice-chairman of the gathering. Among the committee members were ARTHUR R. DAVIS, Staff, Secretary of the Northeastern section; HERVEY J. SKINNER '99, group meetings; HERBERT L. SHERMAN '02, parking arrangements; JOHN M. BIERER '10, finance; LEICESTER F. HAMILTON '14, registration; EDWARD O. HOLMES '16, equipment for technical sessions; KENNETH E. BELL '17, entertainment; CHARLES V. BRIGGS '21 and JOHN J. HEALY, JR., '21, trips; and AVERY A. ASHDOWN '24, publications.

¶ Papers were presented by the following: ROBERT S. WESTON '94, "Water Pollution"; PAUL W. LITCHFIELD '96, "Rubber's Position in Modern Civilization"; HERMANN C. LYTHGOE '96, "Composition of Goats' Milk of Known Purity"; ARTHUR A. BLANCHARD '98, "Valence Considerations among the Metal Carbonyls," also, with PAUL GOLDBERG '35, "Preparation of Cobalt Nitrosyl Carbonyl, Cobalt Carbonyl Hydride, and Cobalt Tetracarbonyl by the Cyanide Method." (During October, Professor Blanchard lectured before sections of the American Chemical Society in eight cities of the near West and South.) HERVEY J. SKINNER '99, "Waste Problems in the Pulp and Paper Industry"; CHARLES A. KRAUS '08, "Solutions in Nonaqueous Solvents," presidential address; JAMES A. TOBEY '15, "Legal Aspects of the Industrial Wastes Problem"; JAMES A. BEATTIE '17, B. EDWIN BLAISDELL '32, and JOSEPH KAMINSKY, Arthur D. Little Postgraduate Fellow, "The Absolute Temperature of the Ice Point"; ROBERT V. KLEINSCHMIDT '18, "The Kleinschmidt Still"; CHARLES R. PARK '19, "Some Relations between Vulcanization and Reinforcement"; THEODORE SHEDLOVSKY '19, L. G. Longworth, and D. A. MacInnes, "Electrophoretic Patterns of Normal and Pathological Sera"; RUTH G. CAPEN '20, C. E. Chambliss, and J. A. LeClerc, "The Composition and Food Value of Wild Rice"; WILLIAM C. FORBES '20 and H. A. Neville, "Catalytic Methods for Increasing the Unsaturation of Long-Chain Fatty

Compounds," also, "Wijs Iodine Numbers for Conjugated Double Bonds. The Influence of Sample: Reagent Ratio"; HENRY O. FORREST '20 and P. T. Graff, "Propane Precipitation of Petroleum Resins"; SIMON FREED '20, S. I. Weissman, F. E. Fortess, and H. F. Jacobson, "A Spectroscopic Study. Ions of Europium Distributed between Different Configurations in Homogeneous Solutions"; FREDERICK W. ADAMS '21, "Opportunities for Women as Research Bibliographers"; GEORGE CALINGAERT '23, "The Random Intermolecular Exchange of Organic Radicals"; PER K. FROLICH '23, R. M. Thomas, J. C. Zimmer, L. B. Turner, and R. Rosen, "The Properties of the Polybutenes and Their Uses in Petroleum Products," also, with W. J. Sparks, I. E. Lightbown, L. B. Turner, and C. A. Klebsattel, "The Rubberlike Properties of Polybutene"; BERNARD LEWIS '23 and G. von Elbe, "Anomalous Pressures during Flame Propagation in a Closed Vessel"; LAWRENCE D. SCHMIDT '23, J. L. Elder, and J. D. Davis, "Atmospheric Oxidation of Coal at Moderate Temperatures. II. Effect of Oxidation on the Carbonizing Properties of Representative Coking Coals"; JAMES C. WALTON '23, "What Is Optimum Cure?"; WILLARD L. MORGAN '24, "Pasting and Identification of Starches"; BERTRAM E. WARREN '24, "X-Ray Diffraction Study of the Structure of Glass"; JOHN H. FIELDING '25, "Low-Temperature Set as a Measure of State of Vulcanization"; WILLIAM L. GILLILAND '25, "The Reaction of Nitric Oxide and Nickel Carbonyl," also, with R. L. Annis and L. C. JENNESS '37, "The Effect of Sugars and Some Related Substances on the Strength of Mortars," and with G. A. Noddin and K. W. Percival, "A Comparison of the Reactivity of the Chlorine of Chlorobromobenzene with That of Chlorobenzene in the Formation of Grignard Reagents"; J. FREDERIC WALKER '25 and N. D. Scott, "Dihydronaphthalene Polymers"; BURNHAM S. WALKER '27 and M. C. Darnell, Jr., "The Determination of Sodium in Biological Fluids"; ROBERT S. HARRIS '28, JOHN W. M. BUNKER, Staff, and L. MALCOLM MOSHER '29, "Quantitative Measurement of the Ultraviolet Activation of Sterols. III. 7-Dehydrocholesterol," also, with H. B. Wissmann and DAVID G. GREENLIE '35, "The Effect of Reduced Evaporation on the Vitamin Content of Fresh Vegetables in Refrigerated Storage"; HAROLD T. GERRY '29 and CLARENCE A. JOHNSON, Research Fellow, "The Expansivity of Quartz and Certain

Metals at Low Temperature"; JOHN W. IRVINE, JR., '29, ROBLEY D. EVANS, Staff, and ROBERT C. YOUNG '29, "Concentrating the Uranium Isotope of Twenty-Three-Minute Half-Life"; JOHN G. KIRKWOOD '29, "Co-operative Phenomena in Solids"; ROBERT C. ELDERFIELD '30, "The Cardiac Glycosides"; EDWARD LEE GAMBLE '30 and PAUL GOLDBERG '35, "The Preparation and Properties of  $B_2H_3 \cdot 2PH_3$ "; ROBERT D. NUTTING '30 and D. H. DAWSON, "Chalking of Titanium Dioxide. Pigmented Exterior Finish. I. Synthetic Enamels"; THOMAS E. WARREN '30, K. W. BOWLES, and R. E. GILMORE, "Hydrogenation of Peat Char"; OLIER L. BARIL '31, J. F. MANNING, and J. E. NEWMAN, "The Splitting of Aliphatic Ethers with Dry Hydrogen Bromide"; GEORGE E. MURRAY '32 and CLIFFORD B. PURVES, Staff, "Preparation of Fibrous Iodocellulose Nitrates"; HERBERT H. UHLIG '32, "Carbon Monoxide as an Inhibitor for Stainless Steel"; EDWARD R. ATKINSON '33, "The Atomic Hypothesis of William Higgins"; QUINTIN P. PENISTON '33, J. L. MCCARTHY, and H. HIBBERT, "Fractionation of Acetylated Cell Wall Constituents of Red Oak Wood"; HARRY G. STEINMAN '33, G. O. DOAK, and H. EAGLE, "The Preparation of Phenylarsenoxides in Relation to a Projected Study of Their Chemotherapeutic Activity. I. Monosubstituted Derivatives"; EDWARD W. COMINGS '34 and R. S. EGLY, "Viscosity of Gases and Vapors at High Pressures"; FREDERICK L. KILBOURNE, JR., '34, and H. F. PALMER, "The Chloroform Extract of Reclaimed Rubber"; ERNEST E. LOCKHART '34, V. R. POTTER, and H. von Euler, "The Oxidation of Succinic Acid and Dihydrocozymase by Enzyme Preparations from Sarcomatous Tissues"; VIRGIL W. WARE '35 and W. M. BRUNER, "Evaluation of Nitrocellulose Lacquer Solvents. IV. A Study of Ester Activation by Alcohols and the Use of Alcohols as Lacquer Diluents."

Staff contributions, in addition to the few just mentioned, were made by: JOHN CHIPMAN and SHADBURN MARSHALL; SAMUEL C. COLLINS alone and with R. B. JACOBS, Research Fellow; KARL T. COMPTON (see page 17); ERNST A. HAUSER and IRVING N. SMITH '39, also with H. K. SCHACHMAN; ROBERT C. HOCKETT, S. R. MILLMAN, and ALVA C. SAPP '37, also with H. G. FLETCHER and JAMES B. AMES '37, and with FRANCIS B. CRAMER, Research Associate, and CLIFFORD B. PURVES; HOYT C. HOTTEL and IAN M. STEWART '37; E.

RABINOWITCH, Research Associate; GEORGE SCATCHARD, SCOTT E. WOOD, Research Associate, and JOHN M. MOCHEL, G.; WALTER C. SCHUMB, ROBLEY D. EVANS, and JANE L. HASTINGS '39; CHAUNCEY STARR, Research Associate; CLARK C. STEPHENSON and JOSEPH G. HOOLEY, Royal Society of Canada Fellow; HENRY H. STORCH, Former Staff, with L. L. HIRST, C. H. FISHER, G. C. SPRUNK, and others.

¶ SAMUEL C. LIND '02 has been elected president, to take effect next year, and ERNST A. HAUSER is chairman of the colloid division for the coming year.

### Interesting Miscellany

¶ EDWIN BERGSTROM '99 elected president, and WALTER R. MACCORNACK '03, vice-president, of the American Institute of Architects.

¶ JAMES A. CUSHMAN '03 elected a corresponding member of the Academy of Natural Sciences of Philadelphia.

¶ ANDREY A. POTTER '03 given a four-year appointment as a trustee of the Engineering Foundation, an organization representing the principal engineering societies of America.

¶ CARL J. TRAUERMAN '07 named supervisor for a mineral survey of Montana, a W.P.A. project.

¶ ARTHUR S. DOUGLASS '08 appointed to the City Plan Commission of Detroit.

¶ EDGAR I. WILLIAMS '08 installed as president of the Architectural League in New York City.

¶ DELOS G. HAYNES '09 elected chairman, and LOYD H. SUTTON '08, vice-chairman, of the patent, trade-mark, and copyright section of the American Bar Association.

¶ JEROME C. HUNSAKER '12 elected a vice-president of the American Society of Mechanical Engineers.

¶ CHARLES L. POOL '21 appointed to a five-year term as member of the Rhode Island State Board of Registration for Professional Engineers and Land Surveyors; also recently elected director of the American Industrial Hygiene Association.

¶ ALFRED E. SHAW '22 appointed a member of the engineering and accounting staff of the Public Service Commission in Newport, Vt.

¶ JOHN E. BURCHARD '23 appointed to a special advisory committee on construction under the United States Department of Commerce. This committee is composed of two members from the government, two from industry, and two from education. Mr. Burchard has recently lectured before the Society of Residential Appraisers

and before the wood industries division of the American Society of Mechanical Engineers.

¶ JAMES G. VANDERPOOL '27 appointed head of the art department at the University of Illinois.

¶ ANANT H. PANDYA '31 appointed principal of the Bengal Engineering College in Calcutta.

## DEATHS

\* Mentioned in class notes.

¶ CHARLES F. STONE '71, May 24.

¶ GEO. R. MANN '77, March 20.\*

¶ ARTHUR PLIMPTON '77, July 16.\*

¶ WILLIAM ALLBRIGHT '78, July 12.\*

¶ JOSEPH G. MINOT '80, June 20.

¶ JOHN H. ALLEN '81, June 5.

¶ CARLTON S. BLANCHARD '81, September 14.

¶ EMMONS CROCKER '81, July 24.\*

¶ JOHN F. LOW '82, March 5.

¶ JOHN E. HOWLAND '83, May 3.

¶ ALFRED C. FULLER '85, May 18.\*

¶ GEORGE F. STEELE '85, June 25.\*

¶ HENRY B. ALDEN '86, August 20.

¶ EDWARD COFFIN '86, September 9.

¶ D. LEWIS K. HATHAWAY '86, May 16.\*

¶ S. FISHER MILLER '86, September 2.

¶ ERNEST H. BALDWIN '88, July 28.

¶ WILLARD C. ALDRICH '90, February 19.\*

¶ GUY C. EMERSON '90, JULY 17.\*

¶ SUSAN J. HART '90, June.

¶ MELVILLE WILKINSON '91, July 15.

¶ CHAS. HUDSON BIGELOW '92, June 10.\*

¶ HENRY D. SHUTE '92, July 15.

¶ HERBERT L. WARDNER '92, June 8.\*

¶ J. FRED HINCKLEY '93, July 29.

¶ ALEXANDER HOLMES '93, June 3.

¶ WILLIAM F. HUNT '93, April 30.

¶ GEORGE MOORE '93, July 31.

¶ CHARLES L. NORTON '93, September 8\* (see Institute Gazette).

¶ EDMUND L. ANDREWS '94, March.\*

¶ HARRY A. BROWN '94, May 7.\*

¶ VIRGINIUS A. MAYER '94, December 25.

¶ WILLIAM B. CLAFLIN '95, August 15.\*

¶ STEPHEN D. GAGE '96, October 2.

¶ WILLIAM G. HILL '97, June 3.

¶ MARCELLUS T. ROBINSON '97, June 16.

¶ JOHN ROGERSON '97, November 17.

¶ DICKSON Q. BROWN '98, September 11.\*

¶ JOHN T. ROBINSON '98, June 20.\*

¶ HAROLD E. HOWARD '99, July 4.

¶ GEORGE W. EMERY '00, May 24.\*

¶ GEORGE F. FISK '01, September 4.\*

¶ EUGENE S. FOLJAMBE '01, December 25.\*

¶ SAMUEL ROSNOSKY '01, August 9.\*

¶ CECIL N. HAGGART '03, July 29.

¶ LEWIS R. KAUFMAN '03, July 22.



Great Neck, L.I., on July 20. Thirty-six persons were present, among them, William H. Correale '24, Charles G. Dandrow '22, James F. Downey, Jr., '20, James C. Duff '86, Alfred T. Glassett '20, William L. Keplinger, Jr., '24, William H. Latham '26, Lachlan Mackenzie '22, William H. Mueser '22, William D. Neuberg '17, James S. Parsons '21, Michael L. Radolovich '26, E. Allan Reinhardt '22, Walter T. Spalding '10, James G. Walker '26, Asher L. Weil '01, and John H. Zimmerman '23.

The tournament was, in effect, an all-day outing, with swimming, tennis, putting, and golf. Luncheon and a steak dinner were served, and the merry-making continued far into the night. First prize in the tournament was won by James Walker and second prize by William Keplinger, although all contestants received prizes. One was never at a loss to know what hole the party was playing, because the chorus, led by that powerful basso profundo George Dandrow, could be heard as far as the clubhouse. After the main tournament, a putting tournament took place on the clubhouse greens. When prizes were evenly distributed, Duff took high honors.

The annual bridge tournament for the Dick Ranger Trophy will be under the direction of Al Bassett '26, newly appointed chairman of the card committee. Sessions were held on October 17, 24, and 31 and will continue on November 7 and 14. Nightly prizes, as well as the final tournament prize, are being offered. Many new members are competing in this tournament, and the old-timers are fighting hard to hold their laurels.

In addition to many class dinners and functions which are planned for this season, a series of course symposiums will be held with Course Heads and Professors from the Institute to outline recent developments in the professional fields. Dates for these meetings will be announced as soon as final plans are completed. — The Classes of '27 and '22 held dinners at the Club early in the summer, and on September 8 the Classes of '37 to '41 held a combined dinner which was very successful. — The board of governors have arranged to issue guest cards to all Alumni who have not as yet visited our new quarters. These cards may be obtained at any time by application to the Club.

Many guests visited us during the summer. Among recent visitors were Howard G. Pankratz '29, Justin M. Kearney '38, Edward E. Helwith '35, Felix Stapleton '24, John D. Mitsch '20, H. E. Gobel '41, Jack R. Bloom '30, Rene G. Du Bois '34, Stanley M. Baxter '15, Mark C. Culbreath '30, Robert J. Dorey '27, Noel Chamberlin '04, Viking Enebuske '15, George W. Ewald '37, Carl H. Abel, Jr., '38, Arthur Miller '34, Adolph L. Antonio '37, R. W. Simonds '24, Samuel Paul '35, Matthew L. Rockwell '37, and John D. Baker '38. — JAMES P. EDER '34, *Secretary*, 24 East 39th Street, New York, N.Y. CONSTANTINE S. DADAKIS '34, *Publicity Committee*, 644 Riverside Drive, New York, N.Y.

### *M.I.T. Club of Western Maine*

On Friday evening, June 2, an interesting meeting of the Club was held at the Portland Junior Tech. We were the guests of the Portland Science Club, a new organization sponsored by that institution. Our own William S. Newell '99, President of the Bath Iron Works Corporation, was the speaker of the evening. The attendance was rather small, there being only about 30 men present from both organizations, but those who did make the effort certainly enjoyed hearing Mr. Newell. — ALFRED E. B. HALL '15, *Secretary*, 19 Locke Street, Saco, Maine.

### *M.I.T. Club of Northern California*

Our annual Inverness picnic on Tomales Bay took place on August 20. Again George Atkins '04 acted as guide for the lucky people who were there. The pleasures of a day's swimming, sunning, and gaming were climaxed with sailing voyages under Captain Atkins, who has always stood by on these occasions. — BERT O. SUMMERS '34, *Secretary*, 1230 Bonita Avenue, Berkeley, Calif.

### *Technology Club of Shanghai*

Inasmuch as we had no reports in last year's volume of *The Review*, we submit a summary of our monthly meetings: The place for the meetings has always been the American Woman's Club on Bubbling Well Road, while the time has been on the fourth Thursday of each month, except June, when the meeting came on the fourth Tuesday. The program committee consisting of We-Tuh Kwauk '27, K. T. Li, and George A. Flynn '28 has assisted our chairman, Tsen Fu Wei '20, in arranging for speakers. A list of the speakers and their subjects follows: January, Mrs. Fisher Yu, "Women's Activities During the Present National Crisis"; February, W. Hunter, "Damages, Rehabilitation, and Restoration of Electrical Sources Following the Local Hostilities"; March, Carroll Alcott, "Germany's Aspirations and the 'Mein Kampf'"; April, Sze Ming Sze, "Organization of Medical Work in the Interior"; May, B. Ward Smith, sound films on "The Construction of Boulder Dam" and "The Sceneries Along the Santa Fe Railroad" in colors; and June, John E. Baker, "Organization of Relief Work in China." At no meeting were there less than thirty members present; at one, forty-four; and in June, when the Harvard Club was invited to join the Tech men, members and guests together totaled sixty-three. — Tzu Hsu Chou '26, *Secretary*, Care of Room 420, 406 Kiangse Road, National Commercial Bank Building, Shanghai, China. CHING T. KOO '36, *Assistant Secretary*, same address.

### *Washington Society of the M.I.T.*

For its June meeting the Society decided upon an innovation. Due to the kindness of A. B. McDaniel '01 and Mrs.

McDaniel, it was possible to arrange a picnic on their estate at Waterford, Va., and the date was set for Saturday, June 24, at 3 P.M. The committee on arrangements, headed by C. P. Kerr '11, decided that there would be no taxes, that transportation would be arranged for all requiring it, and that we should bring our wives and families, or sweethearts. Mr. and Mrs. McDaniel supplied the liquid refreshments, and all comers brought food for their own requirements. Even before the meeting it could be seen that we would have an unusually large attendance. Waterford is just beyond Leesburg, which is about an hour-and-a-quarter trip from Washington through beautiful farming country. Things started to happen about three o'clock Saturday afternoon. Across the street in front of Mr. McDaniel's estate the M.I.T. banner mutely announced that this was the place where we were to have a most enjoyable afternoon. Guests trickled in from shortly before three o'clock, most of them arriving before three-thirty, with a few stragglers toward the end of the afternoon, and there was something doing every minute.

McDaniel's place is a beautiful house, over 150 years old, with large grounds, plenty of shade trees, and beautiful restorations all about. One of these, an old schoolhouse, served as depository for the picnic lunches brought by the guests and for the liquid refreshments and ice cream furnished by Mr. and Mrs. McDaniel. Waterford did itself proud. Mac had found it possible to make arrangements with our cohosts — Mr. and Mrs. Edward Chamberlain and Mr. and Mrs. Leroy Chamberlain — to arrange for a personally conducted tour of the town to inspect the restorations of the fine old Colonial buildings in Waterford. He had also found it possible to obtain the use of Mr. and Mrs. Edward Chamberlain's beautiful estate equipped with a private softball diamond, a hundred-foot swimming pool, and tennis and badminton courts. Although the Secretary had sent the announcements in a feeling of optimism, describing the many attractions that would be at hand, no one realized quite how wonderful a time or what excellent facilities would be provided.

One hundred and fifty M.I.T. men, their wives, sons, daughters, and guests attended, and the sweethearts were also at hand. The party split into two groups, one making a tour and inspection of restorations in the old Colonial buildings under the guidance of Leroy Chamberlain, the other adjourning to the athletic field where the youngsters immediately went swimming in a big way, while the graduates indulged in softball. John Fitch '24 and Bill MacMahon '22 were named captains and proceeded to pick sides in turn. While each did his best to get most capable team mates, they were largely frustrated in their respective efforts to win by the Hitlerish attitude of the umpire, Proctor L. Dougherty '97, who apparently was determined that neither side should win. We think that some of his decisions were probably

prompted by a desire to put the man out so that he would not die of heart failure, because some of the veterans were puffing pretty badly. The respective scores were so large that no official outcome can be announced, and the affair so informal that we are sorry we cannot report line-ups. The outstanding ball playing was done by some of the sons, the eight- and ten-year-old youngsters putting the graduates very much to shame. Toward the end of the ball game we were joined by the group which had been on the tour, and all adjourned to the swimming pool. One interesting sidelight was furnished by Mr. Chamberlain's dogs. He had some beautiful hunting dogs who were almost too much interested in a couple of wild ducks that landed on the swimming pool, but who were restrained from their natural impulses, so that no accident occurred. The picture of these dogs standing at the edge of the pool eager to pounce upon the ducks was one that no artist could paint.

The badminton courts at the other end of the athletic field were kept busy, and time to eat came almost too soon for all but the youngsters. All collected in Mr. McDaniel's garden in a quadrangle of beautiful shaded grass surrounded by old, heavy white-pine benches which brought a sort of unity to the picnic gathering, and there was little food left by seven o'clock. All anyone had to do to get variety was wander around and visit his neighbor, coming back with a pickle, a piece of fried chicken, some delicious cake, or what not that he himself had not brought.

Due to the absence of the nominating committee, elections were postponed until the fall meeting. The Mehaffey family indicated its abilities by gathering to furnish the group with a song which was really appreciated. C. P. Kerr '11 acted as spokesman for us in expressing our thanks to the McDaniels and the Chamberlains for the wonderful time they had made possible, and all expressed the hope that we might repeat it. The meeting disbanded at about seven-fifteen o'clock. This affair was such an outstanding success that it is offered as a suggestion to other clubs.

The following M.I.T. men and guests attended: Mr. and Mrs. Edward Chamberlain, cohosts, son Edward and daughter Laura, Mr. and Mrs. Leroy Chamberlain, cohosts, Walter I. Swanton '93, Dr. Lucy Swanton and Margaret, and Peggy Swanton, daughter of Fred W. Swanton '90, Mr. and Mrs. Joseph E. Thropp, Jr., '94, Mr. and Mrs. George E. Stratton '96, Mr. and Mrs. Henry M. Loomis '97, Commander and Mrs. Frederick A. Hunnewell '97 and two guests, Hon. and Mrs. Proctor L. Dougherty '97, Mr. and Mrs. Charles H. Stratton '00, Commander Frederick W. Southworth '00, Mr. and Mrs. Allen B. McDaniel '01, Mr. and Mrs. George E. Marsh '02, Mr. and Mrs. Leroy E. Kern '02, Mr. and Mrs. Merton L. Emerson '04, Mr. and Mrs. George H. Shaw '04 and Jimmy, Mr. and Mrs. Frank W. Milliken '04, Mr. and Mrs. J. Garfield Riley '06, Mrs. M. Hill, Mrs. George L.

Estes, Mr. and Mrs. C. Phillips Kerr '11 with William and Isabel, Mr. and Mrs. George A. Robinson '12, Mr. and Mrs. Alfred E. Hanson '14 with Eleanor, Evelyn, and Elaine, Mr. and Mrs. Frank L. Ahern '14, Frank, Jr., and Dick, Mr. and Mrs. Frank E. Richardson '16, Mr. and Mrs. William C. Mehaffey '17 and William, Jr., Charles B., Frances Ellen, Benjamin, and Gwendolyn, Lieutenant and Mrs. Carl B. Harper '18 with Conrad, Sallie, and Mrs. Harper's mother, Mr. and Mrs. William E. A. Lutz '18 with Mary and Sylvia, Major and Mrs. Lucian W. Burnham '18, Mr. and Mrs. Merritt P. Smith '19 and family, Ken Bernard '22 and Miss Greer, Mr. and Mrs. William K. MacMahon '22 with Donnie, Anne, and Hugh, Mr. and Mrs. Rudolf H. Blatter '22 and Roger, Walter W. Zapolski '23 and Miss Anderson, Mr. and Mrs. William D. Rowe '24 with William, Jr., and Allen, Mr. and Mrs. John D. Fitch '24 with Alan, Daniel, and Douglass Fitch and Miss Grover, William H. Hoar '26, Thomas J. Scott '27, Mr. and Mrs. Frederick W. Willcutt '27 and Fred, Mr. and Mrs. E. Robert Deluccia '27 with Jane and Crichton, Mr. and Mrs. Albert E. Beitzell '28 and Bobbie, Mr. and Mrs. George D. Mock '28 and Dwight, Mr. and Mrs. Laurence L. Defabritis '29 and Sylvia, Mr. and Mrs. Raymond Underwood '29 and child, Mr. and Mrs. George Q. Voigt '29, Jules A. Larrivee '30 and Miss Betty Gray Long, Mr. and Mrs. Frederick W. Turnbull '30 and family, Mr. and Mrs. John Vasta '31 with Bruno and Claudia, Mr. and Mrs. Mario V. Caputo '31 with Brian and Lewis, Mr. and Mrs. Frederick M. Cone '33 and party, Dr. and Mrs. Samuel W. Joel '34, C. Darwin Stolzenback '35 and Miss C. Virginia Diedel, John Lowe, 3d, '37, and Miss Vienna Curtiss, and Hyman Brettman '37.

The Society held its first fall meeting at the Lafayette Hotel on Friday, September 22, at 5 P.M. The Club apparently had not hit its stride, because there was an unusually small attendance, particularly noticeable following the attendance of 150 at the June picnic, so we had to be content with quality in the place of quantity. In the absence of the President and Vice-President, Merton L. Emerson '04 took the chair. Our Honorary Secretary, Henry Randall, Jr., '31, was called upon for a few remarks and introduced a number of new faces to the Society, including his brother Hart Randall, William Cash '24, Robert H. Macy '33, Hamilton H. Dow '35, and John C. Morse '14. We welcome new faces because they augur well for the coming season. With the large number of graduates in Washington and vicinity, we should have a very strong club.

Proctor Dougherty '97 was next called upon as a willing speaker and announced he had a duty to perform. With the failure of the nominating committee to operate at the Waterford meeting in June, the absence of President James '07, and the unavoidable absence of Mr. McDaniel '01, the duties of chairman of the nominating committee had fallen on Proctor, and he came through in his usual fashion with

the following slate: for President, Edward D. Merrill '09, our last year's Vice-President; for Vice-President, Merton L. Emerson '04, formerly our representative at Boston; for Executive Secretary he re-nominated Alfred E. Hanson '14; for Review Secretary, William K. MacMahon '22; and for Treasurer, the incumbent, Charles H. Godbold '98. This last nomination Dougherty said was compulsory because Godbold was away in California at this time, and this might be one way of assuring ourselves of some balance in the treasury on his return. For members of the executive committee in addition to the above, Hewitt Crosby '03 and John C. Damon '05 were nominated. For scholarship committee the following nominees were reported: Henry D. Randall, Jr., '31, at present Honorary Secretary, Chairman; Joseph Y. Houghton '26, Secretary; Paul Weeks '02, formerly of the executive committee; Oliver G. Green '30. In the absence of any other nominations the Secretary was instructed to cast the unanimous ballot for the slate, which was declared duly elected.

Alfred Hanson commented briefly on the large alumni roster in Washington and vicinity, numbering in excess of 600. While this list includes some army and navy officers not actually living in Washington, the net residential membership he estimated at over 500 and announced that 107 had paid last year's dues. In introducing our speaker, Mert Emerson declared that in the last several years the public had become annuity conscious as well as tax conscious, that while about half of the attendance was represented by government employees, undoubtedly all of us would be interested to hear from John J. Corson, director of the Bureau of Old Age and Survivors, who would discuss "New Phases of Social Security Retirement." Dr. Corson began with the discussion of the term "social security," defining security as a continued cash income and social as derived from society, therefore involving protection of society. He described social security as an effort to protect one hundred and thirty million people in this country from unexpected disaster, and felt it was no new phenomenon since we have had social security in certain forms—for example, through workmen's compensation—for the last twenty-five years. Now, with unemployment compensation we protect lost income, replacing the wage income lost. Dr. Corson's field is a particular aspect of social security, namely, old age and survivors security. He classified the chief aims of this phase of the Federal program as: (1) provision for greater protection for a greater proportion of the aged, bringing under social insurance more of those still working by making possible protection under a tax retroactive to January 1; (2) providing more nearly adequate protection for those who will retire in the early years of the system by making possible benefits approximating subsistence; (3) extending the scope of protection by covering hazards or accidents, unemployment, illness, old age, death, and protection of the old widow



or the young widow with children; (4) stabilization of purchasing power by increased rate of benefit in the first years with postponement of increase in tax rates. Corson says we may have protection in three forms, either direct relief, payment as a right in relation to earnings and previous contributions, or a flat pension of a noncontributory sort payable to all, such as the Townsend Plan in its many forms.

Among the questions asked the speaker following the talk, Major Holcombe '04 was cited as an example of a person paying tax for security of others but not in any way covered himself. The speaker quickly admitted that many classes did not come directly under the Social Security Act, but many workers at some time fell under the provisions of the act and thus received protection for a certain period. Counting such workers it has been estimated that 80 per cent of the population will be covered either partially or fully by the act eventually. The speaker said that investigation by competent social workers shows that one quarter of the people over sixty-five in this country need old-age assistance of some kind. The speaker was accorded a vote of thanks unanimously carried. Following his talk we enjoyed an excellent dinner served by the Lafayette.

The following M.I.T. men and guests attended: George W. Stone '89, William B. Poland '90, Frederick E. Fowle '94, Proctor L. Dougherty '97, Merton L. Emerson '04, Frank W. Milliken '04, Amasa M. Holcombe '04, Alfred E. Hanson '14, John C. Morse '14, Al Francis O'Donnell '19, Lawrence W. Conant '21, Perry R. Taylor '21, Lester C. Lewis '22, William K. MacMahon '22, Robert K. Thulman '22, Paul J. Culhane '23, George H. Southard, 3d, '23, John D. Fitch '24, William V. Cash '24, William D. Rowe '24, G. Donald Fife '24, Harry B. Swett '25, Henry D. Randall, Jr., '31, Hart Randall, guest, Robert H. Macy '33, and Hamilton H. Dow '35. — ALFRED E. HANSON '14, *Secretary*, 3424 Quebec Street, N.W., Washington, D.C. WILLIAM K. MACMAHON '22, *Review Secretary*, 818 25th Street, South, Arlington, Va.

## CLASS NOTES

### 1877

John Herbert Avery was born on July 29, 1855, at Bradley, Maine, and died at Loma Linda, Calif., on April 8, 1938. He was the son of Newell and Nancy Eddy Avery. Prior to attending M.I.T., he was a student at the University of Michigan. After receiving his collegiate education he became manager of the Newell Avery Estate and became active as a director in half a dozen corporations. He is survived by his widow, Ella Maria Smith, formerly of Detroit, who spends most of her time at 844 South El Molino, Pasadena, Calif.; by a son, Kenneth N. Avery of Hemet, Calif.; and by two daughters, Florence Avery Barriquand of Pasadena and Elizabeth Avery Hoffman of Litchfield, Conn.

Although he considered himself a member of '76, George R. Mann has been officially listed with our Class for many years. We regret to have to announce his death on March 20 in Little Rock, Ark. The *Arkansas Gazette* published the following account on March 21: "George Richard Mann, who had been a resident of Little Rock since some time after he was selected as the architect of the new Arkansas capitol, died at 6:15 yesterday morning at his home, 1711 Center street. He is survived by his wife, Mrs. Carrie Rock Mann, and by three daughters, Mrs. J. N. Heiskell and Mrs. Elizabeth Mann Rice of Little Rock and Mrs. George H. Burnett of Southboro, Mass., all of whom were near his bedside. Mrs. George M. Armistead is a granddaughter. A brother, William D. Mann, lives at Monterey, Cal. Mr. Mann was married on October 6, 1886, to Miss Carrie Rock at St. Joseph, Mo. . . .

"George R. Mann attended school at Goshen, Ind. After two years in the office of W. H. Brown, an architect of Indianapolis, he entered Massachusetts Institute of Technology at Boston and was graduated with the class of 1876. He spent some time in the New York office of McKim, Meade and White and in 1879 opened an office in Minneapolis, then a town of 23,000 inhabitants, with Edward Stebbins, a classmate at Tech. After serving as a draftsman in Kansas City and St. Joseph, Mo., he designed buildings for wholesale houses in St. Joseph and other cities, the Paxton Hotel in Omaha, the courthouse at Council Bluffs and courthouses in other cities and the Union Stations at St. Joseph and Hannibal, Mo. Mr. Mann designed the Haverly Opera House at Chicago and the city hall at St. Louis. He was the resident architect of the postoffice at St. Joseph and the position of supervising architect of the Treasury was offered to him by President Benjamin Harrison. After removing to St. Louis Mr. Mann built the Martin Dry Goods building, the gateways at Washington Terrace and St. Vincent's Asylum.

"In the international competition for the Carnegie Library and Museum at Pittsburgh Mr. Mann received the first money prize, \$2,000, of the prizes that were divided among 10 leading competitors. His plans were placed first in the competition for the new building of the Philadelphia Bourse, but the award was limited to Philadelphia architects. In competition for the Washington state capitol at Olympia Mr. Mann received the third prize and he was second in the competition for the Minnesota state capitol. His design was placed first in the competition for the Montana state capitol, but the depression that began in 1893 interfered with the original plans of that state for a new capitol.

"In 1901 Mr. Mann was selected as the architect for the new Arkansas capitol. Later he designed the Hotel Marion, the Southern Trust (now the Pyramid building); the Bank of Commerce, later the American Exchange Bank building; the State Bank, now the Boyle building; the Gus Blass department store; and the

auditorium for the old high school. He also designed the high school and the Pines Hotel at Pine Bluff, the Commercial Bank building and the Youree Hotel at Shreveport; the Bently hotel and the city hall at Alexandria, La.; the new Pulaski county courthouse, the Gazette building, and the Thompson building and the Fordyce and Hale bathhouses at Hot Springs. The firm of Mann and Stern designed the A.O.U.W. (now the Professional Building); the Beaumont Hotel at Beaumont, Tex.; the Grimm Hotel at Texarkana; the Slattery building and the Washington Hotel at Shreveport; the Union Bank building and the courthouse at El Dorado; the Arlington Hotel at Hot Springs, the Albert Pike Consistory and the Y.M.C.A. building at Little Rock and the Quapaw, Ozark and United States government bathhouses at Hot Springs. Mr. Mann was senior architect of the association of architects that designed Little Rock's high school. . . .

From one of Mann's sons-in-law we received this paragraph, written by Mann some years before his death: "Next door to the office of my cousin (in Indianapolis) was the office of W. H. Brown, architect. Mr. Brown was a splendid architect, a fine designer, but he did all his own work, and had no draftsman. At last he agreed to take me in his office. Instead of giving me tracings and work of that character that a cub generally works on for the first couple of years, he immediately started me making construction drawings, giving me instructions at all times, so that by the end of about two years I was doing all the detail work of the office. He then said it would be best for me to go to the Institute of Technology in Boston. While I had had a very limited common-school education, I had always been a great reader, had a very retentive memory, was a natural-born mathematician, and had put in a great deal of study in connection with my work in Mr. Brown's office. When I went to Boston, the Institute required two years of general study and at the end of two years the students selected the profession they wished to follow, either civil, mining, or mechanical engineering, architecture, chemistry, or science and literature, which I believe were the principal courses. I was able to pass an examination that allowed me to go directly into the architectural class, so that I was required to spend only two years at the Tech, graduating with the Class of 1876. I was quite successful in school, as I won a majority of the first mentions in the monthly competition that was given the Class."

Arthur Leslie Plimpton died on July 16 at his home, 156 Mount Vernon Street, West Roxbury, Mass. He was born on August 4, 1855, at 7 Hawthorne Street, Roxbury, the son of Jeremiah Plimpton, headmaster of one of the grammar schools in that section of Boston, and Sarah Bradlee Plimpton. His early education was obtained in the Roxbury schools and he was captain of his company in the Roxbury High School military drill and won first prize in one of the early prize drills held in Boston. He was graduated

1877 Continued

from M.I.T., receiving an S.B. as a regular civil engineer, with our Class. In the fall of 1877 he began work in construction of the improved sewage system for Boston, where he remained until 1884. Besides the main sewers in the city the construction included a pumping station in Dorchester Bay and a reservoir on Moon Island. Plimpton made special investigation of the nature of the substrata of Moon Island, involving material changes in the outfall sewer. He also planned a system of triangulation to determine the length of the bay tunnel. In 1886 he first directed his attention to street-railway engineering and in 1887 did all of the civil engineering work for the Metropolitan Railway of Boston and laid out the lines of the original West End Street Railway. After the consolidation of the different Boston roads in January, 1888, under the names of the West End Street Railway Company, Plimpton became principal assistant engineer of the civil engineering department. This company was consolidated with the Boston Elevated Railway Company, and Plimpton had charge of the department of civil engineering with special reference to the surface lines. The track system controlled and operated by the company before consolidating included 273 miles of track with passage of 2,600 cars daily over certain parts of the system. Plimpton enjoyed boat sailing and skate sailing. It will be recalled that Carter and he were pioneers in skate sailing in 1876 and 1877 when they startled the skaters of Dorchester Bay with immense skate sails, handling them with great skill. He was a member of the American Society of Civil Engineers, Boston Society of Civil Engineers, and the Highland Club of West Roxbury. He married Lucy Ella Richardson on December 30, 1890. There were three children: Leslie Richardson, November 18, 1891; Herbert Richardson, October 13, 1894; and Gertrude Richardson, November 1, 1900. Leslie attended Tech for a year in 1915 and died on May 27, 1931, at the age of thirty-nine, leaving one daughter, Hester Joan Plimpton. The latter was married in November, 1937, to Ian M. MacKenzie '38, X, of Brooklyn, N.Y. Herbert was married in 1923 and has two sons, Donald, aged thirteen years, and Walter, aged eight years. Gertrude married Dr. W. E. Crocker, a dentist. They have two children, David, aged eight years, and Janet, aged seven years. Their home is in Needham, Mass. Plimpton's wife died in February, 1930. Herbert had built a house near his father in 1924 and when the latter became too feeble to be left alone, Herbert moved to his father's home and was with him to the end. — BELVIN T. WILLISTON, *Secretary*, 3 Monmouth Street, Somerville, Mass.

## 1878

The *Chicago Tribune* of July 13 reported: "Funeral services for William B. Allbright, president and founder of the Allbright-Nell company, will be held at 2 P.M. today in St. Paul Episcopal church, 4945 Dorchester avenue. Mr. Allbright,

who was 83 years old, died Tuesday in his home at 4918 Kimbark avenue. He was born in Dorchester, Mass., and came to Chicago soon afterward. Surviving are his widow, Marion; two sons, John and Norman of Hinsdale, and a daughter, Mrs. T. Kenneth Boyd of Winnetka. . . ." The *National Provisioner* of July 15 speaks of Allbright's work for the N. K. Fairbank and Company in the use of fuller's earth to improve the quality of lard and to refine cottonseed oil. It continues: "Following his connection with the Fairbank Co., Mr. Allbright went to Swift & Company, where he remained for 15 years in charge of the manufacture and sale of oils, fats, greases and other animal products. During his service with both companies he developed and patented many processes and invented new machines that later became standard in the industry. He had a great deal to do with the establishment of grades and standards for lard and 'compounds,' some of which are still used by the Chicago Board of Trade. He developed and patented stearine for use in hardening fats and oils.

"During the 40 years he devoted to the field of packinghouse equipment, Mr. Allbright contributed many improvements in processes and equipment in rendering, casing cleaning, hog dehairing, depilating and other fields. Although a man of many interests and wide contacts, his interest in the welfare of his employes was always keen and culminated in the establishment of an employes' profit sharing and savings fund. . . ."

Lonsdale Green '87 paid a tribute to Allbright in a letter he wrote to The Review notifying them of Allbright's death: "Personally he was a genial, likeable man. I tried to get him to attend the banquet the Technology Club of Chicago had in November, 1937, and he wrote me that his health would not permit it. I tried again on or about March first of this year. His nurse answered the phone and said that he had returned from Florida a month before and was in such condition that he could not see any company at all. . . . I regret that I cannot do full justice to Mr. Allbright in an obituary, though all I do know about him is much to his credit." — ALFRED S. HIGGINS, *Secretary*, 248 Northern Avenue, Boston, Mass.

## 1881

The *Evening Telegraph* of Colorado Springs, Colo., June 12, brought us news that our classmate Edward Royal Warren had been awarded an honorary doctor of science degree by Colorado College. It gives us pleasure to learn of this honor.

News in the *Worcester Telegram* of July 25 is less pleasant; we regret to report the death of Emmons Crocker: "Emmons Crocker, 84, of Flat Rock road, a native of Lawrence and long-time resident of this city [Fitchburg], died late today at his home. Mr. Crocker came to this city when still a young boy and had lived here ever since. He attended the public schools here and later graduated from Worcester Academy. In the Fall of 1877, the same year of his graduation at Worcester, he enrolled at the Massachusetts Institute of

Technology. In June, 1878, he took a position at the Union Machine Co., in this city. With his brother, Adams Crocker and E. J. Welch, he organized the Union Screen Plate Co. in 1902 and three years later together with Arthur S. Morse and Henry S. Downs, he formed the Union Screen Plate Co., Limited, of Lennoxville, P.Q.

"Mr. Crocker was instrumental in the remodeling and addition to a building close to the Union Screen Plate Co., in which he established the Union Foundry Co. The latter company was a subsidiary of the Union Machine Co. until 1906 when he separated the foundry from the machine company and sold a half interest in the foundry to the D. M. Dillon Boiler Works. A few years later, Mr. Crocker sold his half of the Union Foundry to D. F. Dillon. His holding in the Union Screen Plate Co. of Canada was sold in 1934 to Mr. Downs. He resigned his post as president of the organization at approximately the same time. Survivors of Mr. Crocker include his wife; a son, Edward S. Crocker, 2d; a granddaughter, Lisenard Seabury Crocker, 2d; a sister, Mrs. Cyrus M. Van Slyck, and several nieces and nephews. . . ."

Your Secretary knew Crocker and his chum, who were quite prominent citizens of Fitchburg and can recall an incident from their undergraduate days: One time after a big explosion in the chemical laboratory with the ceiling all covered with the explosion, W. Ripley Nichols '69, Professor of Chemistry, asked what they were there for anyway. The answer was "special in military." — FRANK E. CAME, *Secretary*, Chambly Canton, Quebec, Canada.

## 1885

Our annual luncheon was held at the University Club, Boston, on June 21. Present: Fiske, Hunt, Nute, Packard, Parsons, Pratt, Rawson, Sands, Sise, Wallis, and Worthington, making twelve in all. As there are only twenty-two living in Massachusetts (two in Fall River, two in New Bedford) and some are ill, this was a pretty good representation. As has been our custom, we stood and drank a silent toast to all our classmates who had crossed the Great Divide, and to the living, wherever they might be.

During this year we have lost Edward H. Dewson, who had a wide acquaintance among his classmates, and George F. Steele, associated many years with the Boston office of the General Electric Company. Both of them were prominent in athletics during their undergraduate days, and both were deeply interested in all that concerned the welfare of M.I.T. Alfred C. Fuller, for many years a Baptist missionary in a foreign field, died in May. — ARTHUR K. HUNT, *Secretary*, 145 Longwood Avenue, Brookline, Mass.

## 1886

A clipping from the *Worcester Gazette*, kindly forwarded by O. B. Denison '11, gives an account of the death of D. Lewis K. Hathaway at the Springfield Hospital on May 16. Following his graduation,



1886 *Continued*

Hathaway went to work for the Silver Spring Bleaching and Dyeing Company of Providence, R.I. A year later he joined his classmate Aborn in the drafting department of the Knowles Pump Works in Warren, Mass. For many years he worked for the Warren Steam Pump Company, where he remained in active service in the drafting and designing departments until ill-health compelled him to retire a short time before his death.

Aside from his professional work Hathaway took an active interest in the civic and religious affairs of his home town of Warren. Always a loyal Tech man, his presence will be missed in the activities of the Worcester County Alumni Association of M.I.T. of which he was a member. His wife, two daughters, and a son, Merwin Lewis Hathaway '26, survive him. — ARTHUR G. ROBBINS, *Secretary*, 12 Grove Street, Winchester, Mass.

## 1887

The annual dinner of the Class was held at the Parker House, Boston, on June 4, with the following in attendance: President Taintor, Carter, Hill, Tripp, Cameron, Kendall, W. R. Thomas, Blake, W. C. Cushing, Gay, Lane, Cole, W. H. Brainerd, A. L. Cushing, and Very — a total of fifteen, which was considered a very good showing. Frank Tripp contributed a donation of finest dairy milk chocolate food bars with Brazil-nut meat filling which he is introducing. These were greatly enjoyed. The Secretary announced the passing of six of our number since the last meeting: Edward O. Goss, Warrington G. Lawrence, James C. Hobart, George Otis Draper, Walter S. Moody, and Walter G. Whitmore, and tribute was paid to their memories.

Benjamin C. Lane was unanimously elected class treasurer to succeed our late comrade, George Otis Draper, who had so faithfully filled that important office since organization, or a period of fifty-five years. Another important event was the election of Winthrop Cole to the office of vice-president, a fitting reward for his years of faithful service in the interest of his classmates. Letters were read from Brett, Sturges, Nutter, and others, regretting their inability to be present. Seven of the Class, namely, Carter, Cole, Lane, W. R. Thomas, Tripp, Brett, and Very, attended the Alumni Day exercises in Cambridge on June 5, and all but the last-named two were present at the Alumni Dinner at the Hotel Statler in the evening.

From time to time during the summer months the Secretary has been in receipt of communications from '87 men in various localities and of varying pursuits, most of them expressing regret at their inability to furnish news items of front-page import. Nevertheless, it is interesting to note that Frank Brett of Duxbury is busy with golf and farming, raising "some of the finest corn and tomatoes ever," as he modestly admits, while George Sever in the neighboring town of Kingston, also addicted to farming as a side line, reports good success with

cucumbers, beans, carrots, and beets, in spite of the dry weather. Both appear to be hale and hearty, as is to be expected when one is privileged to "live out in the open, in a country of hillsides and lakes" to quote from one of our dearly beloved classmate's poetical gems in his "Prismatic Verse."

Reminiscent of our student days at Tech was an article in a Boston paper in the "Do You Remember" column; the subject — Austin and Stone's Museum in Scollay Square, the Scollay Square of the '80's: "How many of you remember the wax policeman with the handlebar moustache that stood in the foyer near the ticket window?" Professor Hutchins the Lightning Calculator, the famous Ossified Man (whose name was Gilpatrick, by the way) Jo-Jo the Dog-Face Boy, and even the purveyor of the "extra sour, crystallized, lemon drops, for a cough or a cold, to quench the thirst, promote digestion," were also resurrected to test the mental strength of the decadent. In event of the passage of the above by the editorial censor, you can forward your answer to — NATHANIEL T. VERY, *Secretary*, 15 Dearborn Street, Salem, Mass.

## 1888

In the July issue of The Review we gave the names of eighteen classmates we expected would attend our fifty-first class dinner at President Webster's on June 4. This list was made up five weeks before the dinner and before replies to the invitation had been received. As usual '88 surpassed itself: Not only did all eighteen appear but five more, making a total of twenty-three present at Ned's 206-acre Chestnut Hill country estate. These additional men were Bird, Faunce, Mead, Reynolds, and Stetson. It was Bird's first appearance at a Webster dinner and Linzee's first dinner or reunion of any kind in fifty-one years. Ned's personally conducted tour of his gardens and hothouses containing orchids never before exhibited was more thrilling than ever. The dinner menu included, among other delicacies, individual, whole, roast stuffed chickens, garden peas, asparagus, and strawberries, all grown on Webster's place. To say everything was delicious would be stating it mildly. After dinner we adjourned to the library, where Ned showed us our own movie reel, taken by Walter Shaw at our fortieth reunion at Chebeague Island, Maine, in 1928. It was shown "forwards and backwards" three times so that all could get the exact expression on the faces of each man of the thirty-one present who took part in the parade led by Stone and Webster and the drill led by Sargent Mead. The eruption of a volcano in Honolulu was also shown, through the kindness of Mead. We then moved to the spacious music room where letters from absent members were read, and President Webster concluded the entertainment with his annual talk on "The State of the Institute."

On Alumni Day, June 5, the following men were present: Bird, Bridges, Collins, Ellis, Hamblet, Webster, and Wood. Be-

fore the banquet at the Statler, President Webster provided the appetizers. — Regrets for inability to attend the Webster class dinner were received from the following: Blair, Ferguson, Hodgkins, Foque, Dearborn, Neiler, Cheney, Eastman, Williams, Lee, Sweetland, Stevens, Cole, Stone, and Towne. Donald M. Blair, captain of prize-winning Company B, '88 corps of cadets, wrote: "It is years since I have seen most of the men of the Class, and I am sorry not to accept the invitation to the class dinner. However I'll think of you all and can easily imagine how delightful it will be for the men who have been meeting for fifty years to come together again."

Louie Ferguson said: "I should like very much to be with you, as I well remember what a wonderful time we had the last time I was there. I also recall how very pleasant it was for me at the fiftieth reunion. It was a great pleasure to meet all the old boys, many of whom could not recognize me, as I did not look like the slim Jim I was when I was at Tech. I also enjoyed very much having Harry Horn and George Holman in the room next to me, as they were two of my buddies at Tech. Please say to the boys for me that I regret exceedingly I cannot be with them this year in person, although I will be with them in spirit." — Bird said: "I am hoping and planning to be with the Class at Webster's on June 4. I've always wanted to be present at one of these Webster dinners I've heard so much about but have never been able to make it before and hope I will not be disappointed this time." (He was not. — B.R.T.C.)

On April 16, Henry Bates and the Missus, as he calls his wife, will celebrate their golden wedding — he says, "if we both hold out." Here's hoping they have a grand time on the fiftieth anniversary of their wedding day. We would like to hear from other '88 men who are approaching the semicentennial of their married life. And this brings up the question of grandchildren. While the seven who attended the Alumni Day banquet were partaking of "appetite exhilarators" while waiting for the hour to arrive, at the suggestion of President Webster the question of the number of grandchildren each one had was mentioned. Webster and Hamblet ran a close race, with twelve for the former and eleven for the latter. Next came five, then three threes, and then two grandchildren for the last man. — Conner has just taken a very interesting trip to the west coast of South America, including tours through Colombia, Ecuador, Chili, and Peru. — H. Gregory Hodgkins has a daughter Katharine who wrote in a fine style of penmanship, doubtless inherited from her father, stating that he was unable to attend our fifty-first dinner as he was then in Hines Memorial Hospital, Hines, Ill., where he had been for five weeks and that it might be five weeks more before he could return home. We hope that several of his close friends in the Class will write him about our last Webster dinner, which should cheer him up a bit. — The postscript to Ted Foque's

1888 Continued

letter regretting his inability to be present at Ned's dinner is as follows: "And tell Ellis to filch an extra '88 appetizer and inhale it for me." (Ellis acceded to this request gladly. — B.R.T.C.)

Billy Dearborn wrote from New Orleans under date of May 27 as follows: "I have been laid up at the hospital here and convalescing from a fall which landed me on my back and broke a rib. We were already packed to start motoring home the next day, April 28. I still cannot drive my car and hope to get started home to Sandwich, Mass., by rail next week with it in tow. Otherwise we have had a very pleasant winter here." — Miss Anne Runkle, fourth and youngest daughter of Mr. and Mrs. John Cornelius Runkle, was married to Robert Haven Hose '38 on August 26 in the First Parish Church, Duxbury, Mass. The ceremony was followed by a reception at Tideacres in Duxbury, summer home of the bride's parents. Mr. and Mrs. Hose will reside in New York City. Mrs. Hose was graduated from Bennington College and Mr. Hose from the University of Minnesota and the M.I.T. — Everitt Taylor presented to President Webster a fine etching showing yachts sailing in Marblehead Harbor on the Sunday we were there. He gave the original pencil sketch to the Secretary.

Nathaniel I. Bowditch, with us during our freshman year, stated during a recent Framingham Rotary Club dinner that Middlesex County, of which he is chairman of the commission, is the largest county of 2,950 in the United States. It was established in 1643 and at present has a population of about one million people, a valuation of \$1,141,118,185, and an area of 844 square miles. This information was given us by Bridges, a resident of Framingham. Many of us living in Middlesex County do not realize what a big county we live in and that an '88 man directs its affairs. — BERTRAND R. T. COLLINS, Secretary, 16 Chauncy Street, Cambridge, Mass.

## 1890

June 1 to 3, 1940, is our fiftieth anniversary. Plan to come! — At the Alumni Dinner last June there was some discussion of getting out a list of the Class, with a few lines concerning what each man has done and is doing. With so many outstanding men this would seem worth while if we can get the money and a competent man to do the editing. Atwood, Burley, Crane, Goodwin, Packard, Roots, and Sherman were present throughout the Alumni Day meetings.

Frank Chase, who has been vice-president and operating manager of the Lone Star Gas Company, a fifty-million-dollar organization, has retired. In a letter written in June he says he is going to take several months' vacation, but that he has been too active and busy during all his life "even to think of a life of indolent ease." At a luncheon given by the executive heads of the Lone Star Gas System, he was presented with a watch, and the President, in outlining his activities, said Chase "had been an outstanding figure in the nation's gas business for

thirty-eight years" and expressed "appreciation for the inspiration he had been during his long years with the Lone Star Company." Prior to joining that company Chase had been president of both pipe-line and distribution properties in the Miami Valley of Ohio. Referring to his work, the *Dallas Times Herald* says: "As vice president and operating manager he supervised the production, pipe line, compressor and telephone departments. He was active in the organization of the Community Natural Gas Company, which brought gas service to more than 250 Texas towns. Under his supervision many of the long distance pipe lines of the company were built. He is a past chairman of the natural gas department of the American Gas Association."

Another man who has retired this year is Elton D. Walker, who has been professor of hydraulic and sanitary engineering in Pennsylvania State College. He now goes off the active list with the title of professor emeritus of civil engineering. Before going to State College he had considerable experience in the field, taught at Union College for four years, going in 1900 to Pennsylvania State where he has been the head of the civil engineering department since 1907. Like most of us who have led active lives, he is planning to do a little writing and hopes to do some consulting and research work.

The Secretary took a hot business trip to El Salvador and Guatemala this summer. They appear to be two well-governed industrious countries, with every-one working who cares to.

The address of Frederick W. Swanton has been changed to 3022 Porter Street, N.W., Washington, D.C. — Henry M. Waite who was connected with the National Youth Administration at Eastport, Maine, has gone back to Washington, where he is living at the Brighton Hotel. — Members of the Class will be interested in a biographical sketch of the life of George Ellery Hale which appeared in the May issue of *Isis*, the quarterly organ of the History of Science Society and of the International Academy of the History of Science.

Guy Emerson, who for twenty-six years was consulting engineer for the Boston Finance Commission, passed on at his home in Jamaica Plain, Mass., on July 17. On leaving M.I.T. he became connected with the Massachusetts Metropolitan Sewerage Commission as rodman and later as assistant engineer, and in 1895 became assistant engineer on Boston's first subway. On completion of this he acted at various times as superintendent of the Boston Sewer Division, commissioner of bridges, and superintendent of streets. From 1905 to 1908 he was in government employ in Wyoming in charge of the construction of the Corbett Dam and Shoshone irrigation project. Returning to Boston as superintendent of streets in 1908, he is reported to have cut expenses \$640,000 the first year. His expert advice on all engineering matters guided the Finance Commission from the time it was formed in 1910 until he retired in 1936. Many were the battles be-

tween the Finance Commission and Boston mayors over his estimates. Locally he was one of the best known of our Class.

The Secretary has just received news of the death of Willard C. Aldrich, who was with us for a year or two. In 1896 he became a member of the faculty of the Tome School at Port Deposit, Md., and their Secretary writes that he was "universally beloved in the community as well as in the school circles." The following is clipped from the *Midland Journal*: "In a sense no one can pay tribute to so rare a spirit as Mr. Aldrich. One can only record memories of the man — themselves the tribute. What his name stood for in Cecil County through nearly forty-three years is known best to those whose lives he touched. To the students at Tome his sympathetic understanding of them and the vividness of his interest in their problems will never be forgotten. Few men have had so fine a sense of civic responsibility. With great unselfishness he gave himself unsparingly to the betterment of his community. Often he brought to fruition a cherished vision singlehanded through almost insuperable obstacles. Nothing daunted him. He was back of every fine movement that stood for improvement of the individual, the home, the school, the community." — GEORGE A. PACKARD, Secretary, 50 Congress Street, Boston, Mass. HARRY M. GOODWIN, Assistant Secretary, Room 4-136, M.I.T., Cambridge, Mass.

## 1892

John W. Hall reports that he spent the summer at his home, 8 Hillside Street, Roxbury, "going over to the L Street beach every sunny day, so that I feel quite as well in physical being as my seventy-five years warrant." — William H. Messenger writes from Florida, 144-9th Avenue, N.E., St. Petersburg: "Retired Nov. 1, 1937, and after a month or two drove down here with friend wife to try and ward off the undertaker a short time longer. Go north each summer for three or four months, but this is the place for all '92 men and older. You surely have made more than enough money to retire on long ago."

Herbert Moody retired from his job in May, 1938, but is not content to be idle like some of the rest of us. He writes: "Yes, I subscribe to *The Review* and I agree with you that it is the best-looking and most interesting and instructive alumni magazine that I have ever seen. But I am more and more inclined to place all Institute matters in the front rank. For forty-six years after graduation I was connected with education, and I have never seen any reason for taking Tech out of the top line. My first academic year of retirement is coming to a close. I have been supremely happy and as busy as need be. I have been honored with the chairmanship of the division of chemistry and chemical technology in the National Research Council. That brings me in contact personally and by correspondence not only with all leading chemists but with scientists in all allied fields. I can think of no better fortune for a scien-



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tist than to find outlet in this magnificent organization and its parent group, the National Academy of Sciences. We are housed in a white marble 'palace' opposite Lincoln Memorial. That is twenty-five minutes' drive from my home across the Potomac." Moody's home address is Windover Heights, Vienna, Va.

J. C. Norcross does not have such good news and writes: "I broke my leg on January 6 (and this was written May 11) and was in the hospital for 110 days. I am now back home and learning to walk again, but it is slow work. However, I hope in a few weeks to get back to work again if I can only get some sun which we have missed so much thus far this year." — A. G. Pierce writes from 1312 Cleveland Avenue, Canton, Ohio: "I should like to attend the reunion, more to be at our class meeting than to participate in the general festivity. Technology today is far removed in actuality from the old school as I knew it. I should feel lost in its environment. I read *The Review* regularly and enjoy it. It does bring out how much the school influence is devoted to research. . . ." "As to 'Our News,'" he writes, "it seems as if we should have more news. For example, here we are — a body of men in our late sixties, who have witnessed in our times an unparalleled development in technical arts and have been a part of this development in our own ways, little or great. We have seen this carried to an extreme in producing ideas, tools, and processes, all to make wealth for their owners and happiness in varying degree for all. What are we as M.I.T. graduates of the early Nineties doing to study the plans of our government for promoting more security for those less fortunate than ourselves and what do we know of the activities of others of our Class? How are we applying our training and experience in solving the state and national problems, of such moment at this time?" Pierce prepared a paper dealing with the German scene and read it before the international service committee of the Rotary Club of Pittsburgh on January 18. The paper was an impressive piece of work comprising not less than 1,000 words.

Carlson received the following from Charles H. Chase, who has just completed forty-three years of teaching at the Tufts Engineering School: "Perhaps you may have seen that the Engineering School faculty gave me a dinner last Tuesday (day after the Technology Alumni Dinner) because, having served forty-three years and having been on the staff since and before the beginning of the Engineering School, I am now on leave of absence for 1939-1940 (on my own application to the trustees) and will be on pension after that if things are favorable. I am not sure that the regular work of teaching is less strenuous than doing the work that had been piling up waiting for me in these last fifteen years when I have been doing more than usual outside work; but at any rate I do not have to do it at any particular time and can get to bed nights at reasonable times. That is considerable relief."

The Alumni Dinner on June 5 was attended and enjoyed by Kales, Hutchinson, Fuller, Ingraham, C. H. Chase, Carlson, and J. W. Hall. — The Alumni Office has informed the Secretary of the death of Herbert L. Wardner in Akron, Ohio, on June 8, and the death of Charles H. Bigelow in Plainfield, N.J., on June 10.

Augustus F. Knudsen writes under date of September 8 from Hollywood, Calif.: "As I have been wandering back and forth for a number of years, I am not in touch with any M.I.T. club. Yet as the time approaches for the fiftieth anniversary of the Class, it does bring back old memories and the wish to be at M.I.T. in 1942 if there is any celebration by the surviving members of the Class. I have lost by death the best friends I had — particularly Leonard Metcalf. But I am writing to one or two whose addresses I have. It will please me very much to get an answer to those letters and know what is going on. Please address me in care of my bankers, Bishop Trust Company, Honolulu, T.H. That address will find me wherever I may be in China or India." The Secretary has written Knudsen in reply and suggests that some others do the same. — JOHN W. HALL, *Secretary*, 8 Hillside Street, Roxbury, Mass. W. SPENCER HUTCHINSON, *Assistant Secretary*, 75 Federal Street, Boston, Mass.

## 1893

Charles Ladd Norton's forty-six years' service at Technology was brought to a close by his death at his summer home in Annisquam, Mass., on September 8. He was in his sixty-ninth year. The Class has lost a leading member; the Institute, one who was outstanding for his achievements in making the results of technological training and research of direct, practical use to mankind; and the country, an industrial physicist who early in his career became widely known for his work in fire prevention and the development of fire-resistant materials. For the classbook of 1923, our thirtieth anniversary, in answer to the request for "an outline of what you have accomplished," Norton wrote: "Not much, but I've had a mighty fine time doing it. Have tried to hold up one corner of the Institute and keep some people and some property from burning up unnecessarily." This, however, was but one of his fields of effort, and in his later years especially his interests in industrial physics became much diversified.

Charlie was born on December 11, 1870, at Springfield, Mass., where he received his elementary training in its public schools. Entering Technology with our Class, he was graduated in 1893 in Electrical Engineering. Upon his graduation he was appointed to the staff in Physics and given the task of setting up the heat measurements laboratory, one of the earliest in which systematic instruction in heat measurements was given, a course which he developed to a high degree of efficiency. In 1895 he was appointed instructor in physics, became assistant professor of heat measurements in 1899, associate professor in 1905, and professor

in 1910. In 1917 his title was changed to professor of industrial physics. Upon the resignation of William H. Walker as director of the Division of Industrial Cooperation and Research in 1921, Norton was appointed to succeed him, continuing in that office until his death. In 1922, upon the resignation of Professor E. B. Wilson, he became head of the Department of Physics, a post which he held until 1930. He was one of the faculty members to serve on the Administrative Committee in charge of Institute affairs until a new President was chosen to succeed Dr. Maclaurin.

As physicist and engineer, Norton's work covered a wide field. In the Nineties he worked with the late Francis H. Williams '73 of the Corporation in pioneer investigation of the application of x-rays to medical diagnosis. Throughout his life he was constantly active in the creation of new products and new processes for industry. He was associated with the late Edward Atkinson in pioneer fire-prevention work and with others established the Insurance Engineering Experiment Station. That organization assisted in establishing the recognition of Portland cement concrete as a fire-resistant material, thereby making it available in a large way for construction. Norton's invention of processes for the manufacture of asbestos wood and asbestos shingles and the familiar asbestos materials in such wide use today was perhaps his best-known industrial contribution. Another notable contribution to industry was a machine for making silica brick which superseded the old hand-molding method and is now in universal use. He also contributed to knowledge of high-temperature insulating materials and was much interested in problems of corrosion of metals. Recently he had been engaged in important research on synthetic textile fibers. From his inventions he held over a hundred United States and foreign patents, and he was a director of many corporations which put these patents to use. His published papers beginning with "The X-Rays in Medicine and Surgery," published in 1896, number more than fifty and range pretty much over the field of industrial physics.

During the World War, Norton was concerned with the critical study and development of numbers of new scientific devices for offense and defense. Much of this work was done with the Naval Consulting Board and the ordnance department of the Navy. He also undertook to develop a process for the manufacture of metallic magnesium, the supply of which had been cut off from the Allies at the outbreak of the war. He succeeded in developing an electrolytic process for the preparation of magnesium, and later designed and built a plant which was able to produce the material in large quantities before the United States entered the war.

He was a fellow of the American Academy of Arts and Sciences and a member of the American Physical Society, the American Chemical Society, the American Association for the Advancement of

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Science, the American Society of Mechanical Engineers, the American Ceramic Society, the Society for the Promotion of Engineering Education, the National Fire Protection Association, and the American Society for Testing Materials. Norton's wife, the former Miss Frances Torrey, whom he married on September 24, 1895, was fatally injured in an automobile accident on February 6, 1937. He is survived by three sons, Frederick H. '18 of Winchester, John T. '18 of Cambridge, and Charles L., Jr., '25, of New York; and by three daughters, Misses Dorothy and Margaret Norton of Boston and Mrs. Joseph Batcheller of Los Angeles.

Carleton E. Davis was elected an honorary member of the American Water Works Association at the 1939 convention of that organization at Atlantic City. He had formerly served the association as president. Since his graduation with the Class, Davis's whole professional career has been primarily in the field of water-supply and water-power work in which he has achieved distinction. Engaged on such work in the New England states until 1900 and for the board of water commissioners of Newark, N.J., until 1904, in the latter year he became engineer for the Isthmian Canal Commission at Panama, in charge of installing water-supply and sewerage systems in all towns along the canal. Returning from Panama, he was appointed department engineer of the reservoir department of the board of water supply of the city of New York, in charge of the construction of the great Ashokan Reservoir in the Catskills. In 1912 he resigned to become chief of the Philadelphia Bureau of Water. In 1923 he became manager of the Indianapolis Water Company and since 1925 has been manager and a director of the Philadelphia Suburban Water Company. His address is 762 Lancaster Avenue, Bryn Mawr, Pa.

Arthur Farwell's standing among American composers was firmly established long ago. This year his Symbolistic Study No. 6, "Mountain Vision," received the prize-winning award of the National Federation of Musical Clubs. The concerto was played for the first time in a nation-wide broadcast on Sunday afternoon, May 28, as the leading number of the Columbia Broadcasting Company's symphony hour. As a youth, Farwell showed marked musical talent. However, to meet parental desires that he be equipped with a "useful" education, he came to the Institute and achieved creditable standing in the Electrical Engineering Course. From the day of his graduation with the Class, he was free to devote himself to the profession of his choice — music — which has been his life career. The first six years were given to intensive study of musical composition in Boston, in Germany, and in Paris. Upon his return from abroad in 1899 he served for a time as lecturer on musical history at Cornell University. A few years later, the Archaeological Institute of America sent Farwell west to study and report upon folk songs of the American Indian and other folk songs of Spanish

California. His interest and enthusiasm thus aroused, he established at Newton Center, Mass., his Wa-Wan Press which for many years bore rich fruit in bringing forth works of American composers and in arousing interest in little-known American music. In 1909 he joined the staff of *Musical America*. By 1918 we find him the acting head of the department of music at the University of California. More recently he has held a professorship in music at Michigan State College, East Lansing, Mich. As composer, publisher, editor, musical director and teacher, Farwell has done much to encourage and develop distinctive American music and has himself become an outstanding authority on this subject. This interest is reflected in his own compositions which have won for him deservedly high place among American composers.

Last August the Secretary made a trip from Boston to the Pacific Coast, a journey of 8,500 miles by air, motor, and (some) rail, crossing twenty-six states in fifteen days. His stops included Los Angeles, the Yosemite, San Francisco, Seattle, Salt Lake City, Denver, Colorado Springs, Rocky Mountain National Park, and Cheyenne, Wyo. At Los Angeles he lunched with W. T. Knowlton, who for many years has been engineer in charge of the sewerage work of that city and whom he found vigorous, hale, and hearty. At San Francisco he ran across Severance Burrage '92 from Denver, where he has long held the professorship of bacteriology and public health at the University of Colorado School of Medicine. The focal point of Fay's trip was the San Francisco general conference of the American Unitarian Association, where he had official duties as chairman of the business committee and as director of the association and also represented the Unitarian Layman's League as vice-president. To this conference came Professor and Mrs. Burrage as delegates from Denver. Two successive days spent at the Mare Island Navy Yard near San Francisco and at the Puget Sound Navy Yard at Bremerton, opposite Seattle, were a revelation of the excellence and thoroughness of the preparedness program now being carried out by the Navy Department on the West Coast. At each of these yards, construction is being carried forward at the rate of some \$10,000,000 a year. In each case, new dry docks, machine shops, power plants, and other varied facilities necessary for the construction, servicing, and repair of naval vessels are being provided, and the present program calls for practically doubling the capacity of each of these important yards. In an interview in the Salt Lake *Tribune*, Fay expressed his appreciation, as an engineer, of the high quality of this work which is being done by the Navy Department through its bureau of yards and docks. During a day spent at Salt Lake City, he was the guest of a prominent engineer who is one of the "Council of Twelve" and was received by other high officials of the Mormon Church, including President Grant and former Senator Reed Smoot. Since his first

flight in Europe in 1930, Fay has been an enthusiast for aviation, and he is warm in his praise of the service now rendered by our several transcontinental air lines.

The following changes of address have been received: Edward J. Flynn, 8 Irvington Street, Boston, Mass.; Isaiah C. Hanscom, 51 Addington Road, Brookline, Mass.; John C. Hawley, The Evergreens, R.D. Number 4, Madison, Wis.; Charles G. Waitt, 116 Sutherland Road, Brookline, Mass. — FREDERIC H. FAY, Secretary, 11 Beacon Street, Boston, Mass. GEORGE B. GLIDDEN, Assistant Secretary, 551 Tremont Street, Boston, Mass.

## 1894

Reunion — 45 years out — has come and gone, leaving a particularly happy set of memories for those of us who were privileged to attend. A brief account of our doings may be of interest to those who couldn't come and perhaps, by recalling the events of our get-together, to those who were present. June 2 was a fine summer day. During the morning various members of the Class dropped into the office of the Dean of Science and reunion began then and there. At noon we gathered at the Graduate House and at one o'clock had an excellent luncheon served in the Dutch Room. President Compton joined us at luncheon and gave us cordial greeting and one of his always admirable and interesting talks about some of the things going on at the Institute. On the whole we got the impression that he rather approves of '94. Those present at the luncheon were two of our coeds, Mrs. Darragh de Lancey (Harriet Gallup) and Mrs. Walter Griffin (Marion Mahoney), Al and Mrs. Tenney, Walter Batson, Horace Crary, Ned Hunt, Henry and Mrs. Warren, Joe Thropp, Nathan Day, Billy King, Tom Curtis, Alan Claflin, Austin and Mrs. Sperry, John Nowell, George Taber, Fred Baker, Arthur Patrick, Warren and Mrs. Jenney, Will Bovey, Billy Sayward, Will McJennett, George Owen, and Sam and Mrs. Prescott. The luncheon was a jolly affair, and the reunion started most auspiciously. It was interesting and amusing to observe the rediscovery of long-absent classmates, but it did not take many minutes to get back to a spirit of comradeship fully as genuine and friendly as we knew in the days when, as newly fledged graduates in 1894, we said our farewells in Rogers Building on Boylston Street.

After the luncheon there were plenty of cars available for our hegira to East Bay Lodge at Wianno on Cape Cod. No attempt was made to travel en masse, but all planned to meet at seven o'clock for dinner. Unfortunately Fred Baker and Warren and Mrs. Jenney were not able to go. Jenney was just recovering from a bad accident, and attendance at the luncheon was his first public appearance since his misfortune. His spirit in coming to this event while still in the hands of his doctors was fine, and was greatly appreciated by the others present. At East Bay Lodge our numbers were swelled by



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the arrival that evening or on Saturday of Bob Weston, Leon Davis, Roland Bailey, Norwin Bean, and Luther Nash.

After dinner on Friday evening we gathered in the hotel lobby and George Owen showed many of his beautiful pictures, both movies and stills in color. The scenes included yachts and yacht racing, the Tech dinghies, athletic events, especially dashes, both in regular and slow motion, and a series of beautiful gardens and landscapes in color. It was a grand show. One of the slides shown was the class picture of '94 taken for "Technique" on the steps of the Natural History Society's Building in 1893 (what a transformation in some of the members since those days!). After showing his pictures Owen left for home at 10:45 p.m. on account of a Saturday engagement he could not break. It was as fine an exhibition of class spirit and coöperation as one is likely to see. Sayward then entertained the group with a recital of a couple of brief plays; this was also much appreciated, for William does this sort of thing very skillfully. Mrs. Griffin then showed a number of the wonderfully executed drawings of some of her late husband's architectural triumphs. They were unusual and really beautiful, and it is surmised that they represented some of her own skill as draftsman and her own coöperation in planning and design.

Saturday was another perfect day. The golfers had a tournament at the Wianno links. Nongolfers drove about the Cape, bathed, photographed, and played bridge, or gathered in groups on the comfortable porches and exchanged experiences and memories of more than two score years. Some of the expert and hardy golfers played morning and afternoon; others found one round about their limit. The star performers, as in earlier reunions, were Crary and Bean, and by the method of scoring used they were tied for the championship and the grand prize was divided between them. That evening we had the class dinner, all being at one large U-shaped table. Mr. Brown certainly gave us a real banquet. From the cocktails to the dessert, the dinner was one to be remembered. After dinner came the election of class officers, with Horace Crary re-elected as president for the next five years. The Secretary, having been sentenced for life at an earlier reunion, was merely reconfirmed. Crary opened the informal speaking, and the Secretary reported the class statistics, read letters and telegrams from regretful absentees, and gave the lengthening list of those who have gone from us. This was the one saddening moment of the whole reunion. Sunday forenoon was a period of farewells, as most of us had to leave before luncheon. A few stayed for another round of golf.

Special mention should be made of those who came from afar. Austin Sperry and Mrs. Sperry drove from California. It was Austin's first reunion and first visit to the Institute since getting his diploma forty-five years before. What a delight it was to have the Sperrys with us. John Nowell also came from California to

combine reunion with a visit to a married daughter who lives near Boston. Although Mrs. Nowell came with John, her maternal instincts prevailed over her attraction for the reunion. Mrs. Griffin might be called the really far comer, for she has made her home in Australia for many years. Bovey from Minneapolis and Patrick from Cleveland, Thropp from Washington and Crary from Warren, Pa., were next in order of distance traveled for the reunion. Price had planned to be with us and had come to America but was unexpectedly called back to Paris a few days before our gathering. Frank Lovejoy had counted on being with us; at the last moment, however, he had a sudden but slight illness, so that his physician forbade his coming. We missed him greatly. Both Price and Lovejoy sent fine letters to the Secretary.

Space will not permit the printing of all the many letters and telegrams of regret, often accompanied by amusing comment or a personal note. Each letter breathed the spirit of loyalty to '94 and M.I.T. Messages were received from Sam Reed of Nehalem, Ore.; Harry Bates, Atlanta, Ga.; Harold Chase, Danville, Va.; Tom Richards, New York City; Mason Chace, on T.W.A. plane bound for San Diego; Arthur Clement, Chicago; Lewis Greenleaf, Loudonville, N.Y.; Charley Meade, New York City; Leonard Tufts, Pinehurst, N.C.; Jim Kimberly and Charles Abbot, Washington, D.C.; Henry Swanton, Westport, Maine; Charles Beach, Dubuque, Iowa; Albert Zimmerman, New York City; John Kittredge, New York City; George Anderson, West Newbury, Mass.; Arthur Shurtleff, Boston; Sam Blake, Schenectady; Leslie Dana, St. Louis; John Ferguson and Horatio Parker, from Florida; Miss Annie Allen and Mrs. F. M. Greenlaw (Emma Kramer); and, of course, from Price and Lovejoy. There were possibly other letters not before me at the moment. How we wished that all the writers might have been with us.

The correspondence incident to reunion has its great joys and also its deep sorrows. Mrs. Dudley Chaffee wrote that her husband had been stricken with an infection and was hospitalized at Sarasota, Fla. We trust he is now recovered. C. R. Boss suffered a severe shock several months ago and our latest news is that he is in the Lawrence and Memorial Associated Hospitals at New London, Conn. Five deaths were also reported: R. Waldo Gilkey at Falmouth, Mass., on Dec. 27; Prescott H. Coolidge at Carmel-by-the-Sea, Calif., on January 14; Donald W. Ross, Jr., at Montreal on March 3; Edmund L. Andrews at Chicago in March; and Harry A. Brown at Whitinsville, Mass., on May 7. The class sympathy goes out to the families of all these men. We wish also to express our deepest sympathy to Mr. and Mrs. T. P. Curtis on the death of their daughter a few weeks ago.

Let me close these notes with a more cheerful item: George Taber and his wife have just started on a two months' motor trip to Seattle, San Francisco and its

Exposition, Los Angeles, San Diego, Grand Canyon, Carlsbad Caverns, Hot Springs National Park, and the Great Smoky National Park. Taber hopes to see Sperry and Nowell, and the Secretary has given him several other addresses. — Can any one supply news or the address of Nelson W. Dalton? He has been "lost" for a long time. — SAMUEL C. PRESCOTT, Secretary, Room 10-405, M.I.T., Cambridge, Mass.

## 1895

Since it was an off year for the Class, only a few members attended the festivities of Alumni Day in Boston last June. There was a corporal's guard at the dinner, consisting of Tom Booth, Sammy Hunt, Henry Jackson, Walter S. Williams, and Yoder. The Class was honored by having a representative at the head table — Jerry Swope. The interest this past year centered in our forty-fourth reunion in New York City; next year, our forty-fifth regular will bring a larger attendance. At least, let's hope so.

The forty-fourth reunion of the Class was held at the Gramatan Hotel, Bronxville, N.Y., on June 10 and 11, and the story of its great success has passed into history. Those who were fortunate to attend enjoyed a program of most fascinating and interesting experiences. In the past the general class reunions have customarily been held at five-year intervals, but some reunions have been held when the get-together spirit of the Class manifested itself or some special occasion warranted calling the Class together.

This forty-fourth reunion originated with the New York boys. While they are good Tech boosters, they are naturally New York boosters. At a New York class luncheon, months past, Gerard Swope suggested a reunion during June, 1939, which would give the boys an opportunity to visit New York City and see the Fair as well. The suggestion carried; and the '95 boys in New York agreed to handle the affair and appointed a committee, consisting of Fred B. Cutter, chairman; John H. Gardiner, vice-chairman; and Azel Ames, Arthur L. Canfield, John D. Moore, Gerard Swope, and Thomas H. Wiggin, assistants. The success of such an event depends upon the proper functioning of the little details which go far toward the comforts and entertainment of those who attend. This responsibility, in the main, fell on Fred Cutter, ably assisted by John Gardiner. Fred was eminently qualified through experience, familiarity with New York during the day as well as the night, and overconscientiousness for the welfare of others. He produced a successful reunion. The program covered a two-day reunion with headquarters at the Hotel Gramatan and included group attendance at the Fair.

Eddie and Mrs. Alden from Hartford decided to see the Fair before the reunion; so they were the first to register at the hotel. Lawrence and Mrs. Barr from Pinehurst, N.C., and the Yoder family from Ayer, Mass., followed soon after. This reunion was Lawrence Barr's first with the Class. Everyone was delighted to see the

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Barrs, who hope never to miss another reunion. Toward evening, Tommy and Mrs. Booth from Boston, Willard and Mrs. Watkins from Bound Brook, N.J., and Walter S. and Mrs. Williams from North Dighton, Mass., appeared in that order. About this time John and Mrs. Gardiner arrived to "pay their respects" and finally all were assembled in one of the corners of the veranda of the hotel. Soon Saturday was at hand, with additional arrivals of Sammy Hunt from Manchester, N.H.; Eugene Clapp from Boston; Charles F. Wray from Rochester, N.Y.; and Edmund D. Barry of Chicago — now of New York. Fred and Mrs. Cutter were promptly on hand, but Jonny and Mrs. Moore from Brooklyn arrived shortly after breakfast. We were indeed fortunate to have as guests Mrs. John C. Wolfe and daughter Anna from Brooklyn, and Mrs. James Humphreys of Wilton, Conn. Mrs. John H. Gregory of Baltimore and Mrs. Edward H. Huxley of Tenafly, N.J., were unable to attend. We were deeply sorry that Mr. and Mrs. Arthur L. Canfield could not come on account of Arthur's illness.

The first official event was the class luncheon at twelve noon at the Gramatan. A splendid menu was served and enjoyed by an enrollment of twenty-six. Jerry Swope was not there because he was busy during the morning, helping to entertain the King and Queen of England. Al Sloan and Mrs. Sloan had previous engagements and did not arrive; the surprise of the occasion was when Reid McManus appeared. The short, round-faced, smiling fellow came all the way from Moncton, New Brunswick, Canada. It was good to see him and his smile, too. After luncheon we held the class meeting with Tom Booth in the chair. Minutes of previous meeting were omitted; roll call was passed by; Secretary's and Treasurer's reports were tabled. Resolved: to send a telegram of cheer to Arthur Canfield and to spread on the minutes an expression of appreciation to Fred Cutter, John Gardiner, and Jerry Swope for their gracious services in making the reunion such a great success. A delightful surprise was the receipt of a telegram from dear Al Zapf in California, sending greetings to the old gang and with best wishes.

The horn sounded! It was the call to the large bus to carry all to the summer home of Gerard Swope, where tea had been arranged for the Class by Mr. and Mrs. Swope. What a delightful change from hot New York hotel life to the cooling atmosphere of a delightful country home. Among the trees of the thickly wooded slopes of Ossining on the Hudson, you will find "The Croft," the summer home of the Swoopes. Their English-type home rests in a cultivated corner of a grove of trees where abound the conventional gardens as well as informal walks, all in a simplicity and attractiveness that makes the place one of enchantment. Here Mr. and Mrs. Swope met the contingent of '95 and entertained them throughout the afternoon. Then suddenly the call was heard: "Time to go, if you want to see the King and Queen." Off we

went, only to see them whirled up the New York highway toward the Roosevelt home. It was a most delightful treat to be with Jerry and his family of children and grandchildren.

Following the King and Queen episode, we traveled together to attend our class dinner at Playland, Rye, N.Y., one of the finest play sections in this part of the country. We were met by Mr. Currier, assistant manager of Playland, who dined with us and was responsible for preparing the splendid dinner we all enjoyed. Awaiting us for dinner were Frank and Mrs. Schmitz, who had not been able to attend the luncheon; it was fine to have them at the dinner. Following dinner we viewed some old reunion films and were photographed by the management. All who attended received a copy of the photograph as a souvenir.

On Sunday morning at eight we started for the New York Fair via bus. The early start was necessary to meet the hour when we were to be ushered into the General Motors exhibit — without waiting; this through the courtesy of Al Sloan, Jr. Jerry Swope also arranged for a special presentation of man-made lightning and the electrical color wonders at the General Electric exhibit. These courtesies were much appreciated by our group. The remaining part of the day afforded an opportunity to get a complete picture of the Fair in general. The bus returned us to our hotel where we parted in groups — some to return at once to their homes, others to go to New York City for a few days longer at the Fair. All will remember Johnny Moore's song of the "Iron Men of '95" and the admonition of the bus guards: "Watch the steep step!"

William B. Stork has returned from Geneva, Switzerland, and may be found at 3923 Canterbury Road, Baltimore, Md. Edmund D. Barry, XIII, formerly of Chicago, has been transferred to New York City, where you can find him at the Universal Atlas Cement Company, 135 East 42d Street. E. Morton Chapman has moved from Washington, D.C., to his home in Intervale, N.H.

Judson C. Dickerman of Chevy Chase, Md., had planned to attend the New York reunion with Mrs. Dickerman, but he could not make it because he had to complete the reports he was preparing for the city of Indianapolis, Ind., on "The Bases of Valuation for Purchase of the Properties and Business of the Indianapolis Water Company by the City of Indianapolis, Ind." He mailed the Secretary copies of these reports, and they are most interesting reading. While in Indianapolis he viewed the Memorial Day auto races, with their attendant loss of life. He also toured the "pits and garages" where the mechanics prepare their cars for the terrific speeds on the track. After final inspection he raised this question: "I wonder if the curves are banked properly for the possible 125- to 150-mile speeds at which the cars approach them?" He doubts if the track has been modified to keep up with the rapidly increasing speeds of the racing cars from year to year. The question is certainly pertinent.

Each summer, when possible, the Yoders take a trek around Cape Cod. The first stop this year was with Con and Mrs. Young of '95. Following this, while at the summer home of Mrs. John H. Gregory at Harwichport, we had the pleasure of a call from E. Lawrence Hurd and Azel Ames, both old salts of '95. Hurd has retired from active business and was sojourning at his summer home in Chatham. Ames looks as young as ever and was summering on the Cape while recuperating from a hospital stay which prevented his attendance at the reunion. We certainly enjoyed this three-cornered reunion.

Although a reunion was held in June, it will not replace the regular five-year reunion which should be held prior to the Alumni Day in June, 1940. Plans are under way and due notice will reach the class membership for their consideration and suggestions. We sincerely hope it will be another memorable, well-attended occasion.

"His goal is: 'Economic Literacy.'" Such is the refreshing panacea for some of the ills of business and industry, as conceived by Alfred P. Sloan, Jr., who established a \$10,000,000 educational foundation. "Having been connected with industry all my life," the quotation continues, "it seems eminently proper that I should turn back, in part, the proceeds of that activity, with a hope of promoting a broader as well as a better understanding of the economic principles and national policies which have characterized American enterprise down thru the years, and as a result of which its truly marvelous development has been made possible."

"That was the motive of Alfred P. Sloan, Jr., when he set up the \$10,000,000 educational foundation, named after his father. On May 23, last, Founder Sloan was 64. He was born in New Haven, Connecticut, son of a tea and coffee importer. The family moved to Brooklyn and Sloan, Jr., ahead of his class in high school, quit to get to college quicker, was disappointed when they rejected him because he was too young. He made it up by finishing the four-year course at the Massachusetts Institute of Technology in three years. At 22 he was head of the Hyatt Roller Bearing Co., in Newark, built up the firm's business from \$2,000 a year to \$20,000,000 a year. In 1916 he went into autos, has been there since, is still Chairman of the huge General Motors Corporation."

Fred Cutter has not forgotten his love for the Maine woods and the "down-east" waters. He writes of renewing his youth while he and Mrs. Cutter were sojourning during the summer, at Five Islands, Maine. He tells the proverbial fish stories about handling 40-pound halibut, overgrown clams, and six-pound lobsters, all of which contributed to making him feel younger, at least.

William Bement Clafin passed away at his home, 1250 Santa Barbara Street, San Diego, Calif., on August 15. Bill was a life-long architect. After graduation he was associated in turn with McKim, Mead and White; Carrere and Hastings;



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Trowbridge and Livingston. During December, 1901, he became resident architect for the New York and New Jersey Telephone Company at Brooklyn, N.Y. Following this connection he practiced architecture on his own account for a period of four years. From April, 1915, to May, 1917, he was consulting engineer with Guy Lowell '94 and Godley and Haskell, both of New York City.

During the World War, Clafin was graduated from the first training camp with the rank of captain in the reserve corps of engineers and served overseas. He was finally discharged at Camp Humphreys, Va., in January, 1919. Clafin, for a number of years, was interested in, and responsible for, the design and building construction of the New York City Court House. Following this work he developed ill-health and remained at his home in New Canaan, Conn. He fought an incurable heart affection and finally moved to California to rest in a less rigorous climate. Mrs. Clafin survives him, as do a married daughter, Mrs. Ruthven E. Libby of Arlington, Va., and a son, William Bement Clafin, Jr., of Wayland, Mass. — LUTHER K. YODER, Secretary, 69 Pleasant Street, Ayer, Mass. JOHN H. GARDINER, Assistant Secretary, Graybar Electric Company, 420 Lexington Avenue, New York, N.Y.

## 1896

On the day these notes are being dictated, toward the end of September, the summer is over and we are all getting back to work. The Secretary was on the job at M.I.T. up to August and then was away at the old Locke homestead in New Hampshire, later making a quick automobile trip to Ontario. He returned by way of New York and, having a few spare minutes, just before one noon he called upon John Tilley. John insisted upon lunch, which was very enjoyable, although rather brief. John did not have anything special to report in the way of news, except that he was busy and his firm of Vermilya-Brown had a job in Washington and also had been doing quite a bit of work in connection with the New York World's Fair.

Rockwell had his usual summer trip to Tennessee to visit the Rockwell family. He and Mrs. Rockwell made the trip by automobile and visited relatives in New Haven, took in the Fair in New York, and enjoyed some of the fine scenery of the mountains in Virginia and Tennessee. On their return they stopped in Washington and tried to get in touch with C. W. Perley and Marshall Leighton, but both were absent. However, John did find Billy McAlpine who, as one of the United States Engineers, reported that he was having a busy time as usual and would shortly be coming to New England on a trip to look after some government work. John also reported that Billy Anderson was spending a few days in Boston on his way back to Cincinnati from his summer home at Biddeford Pool, Maine.

The Secretary had a letter in August from Charlie Newhall, who for many years has been located at Medford, Ore.

Charlie said that he was as usual carrying on his job of running a ranch on which he raised pears and did some farming, but that the job was not too arduous and he had plenty of time to go fishing and otherwise enjoy himself. — A letter from Charlie Paul in Dayton, Ohio, gave the information that Charlie was very busy on personal consulting work on dams, foundations, flood control, and other water-control products, so that his trips were taking him to various points, as far east as Hartford, Conn., and as far west as Sacramento, Calif., including also Alabama, North Carolina, Tennessee, Kentucky, Texas, Arizona, Utah, Washington, Idaho, and Colorado. He does a lot of traveling but naturally cannot complain since it means that he is kept busy. Actually he manages to spend about half of his time at home. He sees McAlpine frequently in Washington, and Grover occasionally, and some other classmates now and then.

Admiral Bakenhus spent his summer around New York and wrote that he did not find the climate too bad on the whole. In June he and Mrs. Bakenhus were guests at St. Lawrence University, at Canton, N.Y., where he was in attendance as a member of the conference on Canadian-American affairs.

A post card from Johnny Halloran reached the Secretary the last of July. This was mailed from San Francisco and indicated that Johnny had gone far afield from his home town of Toledo. He was making what he said was a very enjoyable tour, seeing Colorado, New Mexico, and California, and was scheduled to go up the coast to Canada and take in Banff, Lake Louise, and other scenic points of the Canadian Rockies. A note also came from Marshall Leighton in June. Marsh regretted that he was not here on Alumni Day, but he wanted everyone to know that he was very busy over surpassingly interesting work and was in an astonishing state of good health. He expressed it thus, like the Miller of the Dee: "I envy no one, no, no, not one, and no one envies me." He already has on his calendar to be present at our forty-fifth anniversary in Osterville in 1941. — Letters were also received from Arthur Baldwin in Paris in June and Charlie Lawrence in Baldwinsville, N.Y., but neither gave any items of news.

Paul Litchfield was in Boston the latter part of June and called upon the Secretary who, unfortunately, was absent and missed the pleasure of seeing Paul. Incidentally, Paul did a little sleuthing to locate one of our classmates, Francis R. Peabody, who had lived for many years in Akron. He located Peabody in Gilead, Maine, where Peabody had retired last October. Obie Denison '11, whose eagle eye never fails to catch an item on a Technology man, has called the Secretary's attention to the August 21 issue of *Time* which had an intimate snapshot of Paul and an excellent story about him and his position in the rubber market.

Father Partridge has been getting quite a bit of publicity this year. The *Seattle Post-Intelligencer* of Saturday, June 3,

carried a characteristic picture of him in his clerical robe and a story of his work as traveling priest of the Episcopal church, or, as he was called, the "old priest of the highway." He was on his way to Alaska with Bishop Rowe in connection with the thirty-seventh Alaskan church which was to be built at Fort Yukon. Later on in August the Fairbanks *News-Miner* reported the arrival of Bishop Rowe and Father Partridge in Alaska, telling how Partridge had traveled 40,000 miles without pay, and referring to Partridge's pastorate in Sitka many years ago. Later on in August, Partridge sent the Secretary some post cards when he was en route on the S.S. *Yukon* traveling on the Yukon River. By coincidence our classmate Walter Leland was on that very boat; so the two of them got together and had a fine passage.

On Alumni Day in June, '96 kept up its reputation by turning out in good numbers. Those present at luncheon or dinner or otherwise during the day were Harry Baldwin, Dave Beaman and son, Bob Davis and Mrs. Davis, Jim Driscoll, Henry Gardner, Henry Grush, Frank Guptill, Will Hedge, Frank Hersey, Charlie Hyde, Gene Laws and Mrs. Laws, Mrs. F. W. Lee, Locke, Lythgoe and Mrs. Lythgoe, Myron Pierce, Elmer Robinson, John Rockwell, Sam Smetters, Charlie Tucker and Mrs. Tucker, Lloyd Wayne and his brother, and Con Young. To Charlie Hyde went the honor of coming the longest distance, all the way from California, but his stay was all too short. The result was we did not see as much of him or hear as much of his doings as we should have liked. Now that Wayne has retired he is a free nigger to come and go as he likes. Karl Pauly wrote that he expected to be here, but at the last moment something came up which prevented him from coming. Karl is so modest that he never says anything about himself, and it is therefore only after considerable lapse of time that the Secretary learned that he was retired from active duty as engineer of the industrial department of the General Electric Company after thirty-nine years of service. He continues to act in a consulting capacity for the company and retains his office in Schenectady.

Classmates will commend the enterprise and loyalty of two members of '96 in securing tangible mementos of the old Rogers and Walker buildings. Charlie Tucker saw Rogers being razed and approached the wreckers for one of the steps. He was able to secure it, and it is now installed as a substantial granite step leading up to the Tucker house on Mill Road in North Andover, Mass. It bears the legend "A Rogers' step 1865-1939." This was certainly a fine idea of Charlie's to take this 1,400-pound step of Quincy granite and install it in his piazza. Marion Lewis Chamberlain Lee also had the hardihood to apply to the wreckers for a memento, and when they asked her what she wanted she selected some of the wrought-iron fence at the rear of Walker, which she thought would be suitable for a garden gate. Actually they gave her twenty-eight feet of it, in two

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sections. The exact disposition has not been decided upon, and it may possibly be used around the new Technology grounds or on Mrs. Lee's estate in Walpole.

Paul D. Smith died on July 16, 1938. He was here for only one year with our Class and registered in Electrical Engineering. He was born November 4, 1873, the son of Thomas T. and Emma A. Smith. His connection with our Class has been practically nil; his career has been centered around central Pennsylvania. He has held positions of distributor for the National Fire Extinguisher Company and sales manager for R. Parke Regester, both at West Chester, and the East End Hardware Company at Sunbury. He had made his home at Winfield. He was married and had two children but lost his wife several years ago. He apparently took an active part in the business and social life of his community and was a member of the West Chester Club, the West Chester Golf and Country Club, and the Princeton Club of Philadelphia.

Walter H. Coristine died in April, 1938. He studied electrical engineering with our Class for two years and later, in 1915 and 1916, took short courses at the Massachusetts Agricultural College in Amherst. He was a member of the Delta Epsilon Fraternity. He was born on February 26, 1874, in Montreal, Quebec, the son of Thomas J. Coristine and Elizabeth R. Hawes Coristine. He was a Canadian citizen, although his mother was a Bostonian. He married Mary C. Shannon of Lee, Mass., on August 31, 1901, and had a daughter Elizabeth, who was born in Montreal on August 6, 1907. His active business career centered around Montreal. He was manager of the Alex. W. Grant and Company, exporters, in Montreal, from 1900 to 1910, and was with Charles Coristine, wholesale hats and furs, in Montreal from 1910 to 1912. He moved to New York City in 1912 and was for two years president and treasurer of the Metropolitan Pharmacal Company. His natural hobbies were fishing and shooting, and after he retired from active business in 1914 he seemed to have an interest in agriculture, which was the cause of his studies at the Massachusetts Agricultural College. He lived for a while outside of Framingham, Mass., but for the past few years had his farm on Old Road in Eliot, Maine. He was of a retiring disposition and, while he seemed to show an interest in the Class, giving it his support, he never participated in any of the class activities. He had promised on more than one occasion that he would attend the class five-year reunions, but he never turned up. — CHARLES E. LOCKE, Secretary, Room 6-201, M.I.T., Cambridge, Mass. JOHN A. ROCKWELL, Assistant Secretary, 24 Garden Street, Cambridge, Mass.

## 1898

Several new addresses have come in during the summer: Howard L. Bodwell, Carnegie-Illinois Steel Corporation, Carnegie Building, Pittsburgh, Pa.; Horace A. Kelley, Jr., 1051 East 6th Street, San

Bernardino, Calif.; Professor A. Appleton Packard, 1 Orchard Street, Andover, Mass.; General George B. Pillsbury, Ross, Calif. (home address); George L. Smith, Windsor, Vt. (home address); Dr. S. Fosdick Jones, Apartment 1123, Cosmopolitan Hotel, Denver, Colo. This is described as his home address. It will be remembered that, after a brilliant medical career in Denver, Jones retired to Pasadena a few years ago.

We quote a paragraph written by Dale Carnegie in the Chattanooga, Tenn., *News* of June 14, showing Roger Babson in characteristic light: "If you are going to graduate from college this Spring, you are probably thinking about how you can get a job. Well, I'll tell you how one young man got his. His name is Roger W. Babson, and he lives in Babson Park, Mass. He is now a world authority on finance and economic trends. When he graduated from the Massachusetts Institute of Technology, he wanted to get into the statistical department of a banking house. But he couldn't get a job. He walked the streets of Boston for weeks looking for a job. His money ran so low that he had to go hungry. He kept on looking. His shoes wore thin. . . .

"One day as he was studying the want ads he saw one which said: 'Wanted, An assistant in the statistical department of a banking house. Write box 43.' This was exactly what he wanted. He wrote a letter describing his qualifications, but received no answer. He knew other replies were pouring in, but he was not going to let his chance slip. He went to the postmaster and asked who rented Box No. 43, but the postmaster said it was against the rules of the department to give out such information. He was courteous, but adamant. Babson was stumped. But he was going to have that job.

"One night as he was going to bed he had an idea. He would go to the box and wait till the banking house sent for the mail. He was living in Gloucester which was more than thirty miles from Boston. The only train left at 6 in the morning. But he was on it. He went to the post-office, located himself there to watch. For a long time nobody came. Then, finally, a Negro boy with a mail bag appeared. Young Babson got a jolt. Was the banking house expecting enough replies to fill that bag? He went up closer and read on the bag: 'E. H. Gay & Co., Bankers.' He hurried to a directory and looked up the address and then ran as fast as he could, getting there before the colored boy did.

"He asked who did the hiring, and found out that it was Mr. Gay himself. He sent in his name, and finally got to see Mr. Gay. He told him what he had done, and Mr. Gay looked through the file and sure enough there was his letter. Mr. Gay read it, thought a moment, then said: 'Your letter is the poorest of the whole lot. But you are the most enterprising. And that's what I want—enterprise. I will take you on.'"

A. Loring Swasey, captain in the United States Naval Reserve, was chief marshal of the American Legion state

department parade on August 19 at Taunton, Mass. — We have a picture post card showing some Swahili beauties from Charlie Hurter, postmarked Dar es Salaam, South Africa. — We have another group letter from Lester Gardner, describing the Glacier View Airline from Montreal to Vancouver over Trans-Canada Air Lines. We quote one paragraph to show the sort of thrills Lester gets: "At lunch in Winnipeg, Mr. Thompson, general manager of Canadian Airways, suggested that I might find a flight to the new mining town of Zeballos a unique experience. You will agree, I am sure, it was not only a most interesting trip but sensationally beautiful. Before we start, let me put a picture in your mind. Place the Thousand Islands of the St. Lawrence off the Mount Desert coast of Maine, and then place in the background a beautiful section of the snow-clad Alps. Hold that in your mind and you will have a perfect idea of the magnificent views that I saw on this short two-hour flight from Vancouver, over the Strait of Georgia, to the northwest shore of Vancouver Island."

We have to report with great sorrow the deaths of three of the most prominent and successful members of our Class, all of whom retained an active interest in class affairs and were faithful in attending class reunions: Dickson Q. Brown, John T. Robinson, and Allston Sargent.

From the New York *Herald Tribune* of September 13: "Dickson Queen Brown, former president and director of the Royalty Corporation of America and former vice-president and treasurer of the Tidewater Oil Company, died on Monday at his home at 144 East Thirty-sixth Street. He was sixty-six years old. Mr. Brown had been associated with oil interests throughout his business career. In addition to his positions with the Royalty Corporation of America and the Tidewater Oil Company, he was a former vice-president and treasurer of the Consolidated American Royalty Corporation and a director in several other corporations. He was born on April 2, 1873, in Pleasantville, Pa., the son of Samuel Queen and Mary Lamb Brown. His father was president of the Tidewater Oil Company.

"Mr. Brown attended Phillips Exeter Academy and was graduated from Princeton in 1895. In 1898 he received a Bachelor of Science degree in electrical engineering from the Massachusetts Institute of Technology, and during the next year he studied at the Royal Mechanical Technical School at Charlottenburg, in Berlin. Shortly after this Mr. Brown entered the service of the Tidewater company as acting assistant mechanical engineer of refining, and a year later he was transferred to the main office in New York. Subsequently he became vice-president and treasurer of the firm and also vice-president and director of the Petroleum Rights Corporation; secretary and director of the Muskogee Electric Traction Company, and a director of the Midland Royalty Corporation. Formation of the Consolidated American Royalty Corporation,



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announced in 1931 with Mr. Brown as vice-president and treasurer, involved consolidation of seven of the largest oil royalty companies in the United States."

From the Boston *Evening Transcript* of June 21: "John T. Robinson, 63, head of the paper box manufacturing concern bearing his name, and a pioneer in the automobile manufacturing business, died of a heart ailment yesterday. His home was at 81 Child street, Hyde Park. After Mr. Robinson was graduated from Massachusetts Institute of Technology in 1898 he entered the paper box business founded by his father. Shortly afterward he began the manufacture of the Pope-Robinson automobile in Hyde Park. Later he gave up building cars and returned to the paper box business. At the time of his death he was president of the Canadian and National Paper Box Association. He was also a member of Christ Episcopal Church, Hyde Park. . . . Mr. Robinson leaves his wife, the former Pearl C. Graham; a daughter, Mrs. John Upham of Hyde Park, and two grandchildren."

From the New York *Times* of April 17: "Allston Sargent, president of the Sargent Metal Window Corporation, a subsidiary of the American Radiator and Standard Sanitary Corporation, died yesterday . . . after an illness of two weeks from a kidney ailment. He was 62 years old. Mr. Sargent was born at South Brewer, Me., July 20, 1876. He attended the Massachusetts Institute of Technology. For the last forty years he was closely connected with the building supply business of New York and the firm of which he was president supplied material for most of the large skyscrapers in the city. He was a member of the Metropolitan Club, the Technology Club of New York, and the Apawamis Club of Rye. Surviving are his second wife, Mrs. Ruth Loughry Sargent, and a son, John Allston Sargent of New York. His first wife, Mrs. Harriet Austin Sargent, died in 1935" — ARTHUR A. BLANCHARD, *Secretary*, Room 4-160, M.I.T., Cambridge, Mass.

## 1900

Alumni Day with this Class was a success. At the lunch on the green, Batcheller, Fitch, Jackson, Russell, Ziegler, Cutting, Neall, Draper, Ingalls, Wastcoat, Mr. and Mrs. Charlie Smith, and the Secretary had a very enjoyable time, and in the evening nearly all stayed to make a good showing for this Class. During the day, plans were discussed about the 1940 reunion, and a definite decision arrived at. East Bay Lodge seemed to be the unanimous choice, and the committee will go ahead with the plans.

Fred Everett, highway commissioner of New Hampshire, with several other state officials, accompanied the governor, Francis P. Murphy, on a state-wide tour of inspection during the summer, one of the objectives being the ride to the top of Cranmore Mountain. — Richardson telephoned to report the death of George W. Emery, III, on May 24 in New York City. The details will follow in a later month. — Notice has just reached

here of the death on January 27, 1938, of Harry L. Hunt, VI, of Stratford, Conn.

We are indebted to James A. Burbank '16 for the following newspaper clipping: "Rev. George Crocker Gibbs, M.A., rector of the Church of our Saviour [East Milton, Mass.], announced . . . that he had submitted his resignation to the vestry of the church, to become effective August 1. It is the intention of Rev. Mr. Gibbs to enter one of the monastic orders of the Episcopal Church some time in August. The announcement was received with intense regret by members of his congregation, to whom he has endeared himself during the five years of his rectorship by his zeal and indefatigable energy in building up the church membership and the various church societies. It is understood that members of the vestry were greatly surprised on receipt of the resignation and did everything in their power to have Rev. Mr. Gibbs reconsider his decision to leave. Rev. Mr. Gibbs's experience in the Episcopal ministry has been widespread and varied. After his graduation in 1911 from the Episcopal Theological Seminary in Cambridge, he went to Oklahoma, where he devoted several years to the mission field, returning East, where he was stationed outside New York City, later going into the service when the United States entered the World War.

"From 1926 to 1933, he served as canon-in-residence at the American Pro-Cathedral in Paris. He came to the Church of our Saviour in April 1934 and has been active in strengthening the spiritual life of his church. Rev. Mr. Gibbs plans to take a month's vacation, beginning July 1st. He is a native of New Bedford, was educated in the public schools of his native city and in private schools for Massachusetts Institute of Technology, from which he was graduated as a Bachelor of Science. After several years in his profession, he felt his work was the ministry and entered the Theological school at Cambridge, being graduated in 1911 and receiving diaconate orders, six months later being ordained as a priest of the church." — Professor Locke '96 tells us that Robert H. Leach and James H. Batcheller sailed from Seattle in the early part of the summer for a four weeks' trip to Alaska. — C. BURTON COTTING, *Secretary*, 111 Devonshire Street, Boston, Mass.

## 1901

If the European war or other reasons of any kind caused the annual class letter to be temporarily laid aside for future reference, please look it over again now and, if possible, assist your Secretary in preparing the planned-for register by returning the data sheet. The class letter reported the doings on Alumni Day, June 5, and on the previous evening at the Engineers Club, and there will now be chronicled such items of news as have been received since the July Review.

Jack Scully, our popular toastmaster, sent his regrets at not being present on Alumni Day and gave his present address

as 1234 Jones Street, San Francisco. Jack stated that he had been out there for two years and had seen Perk Parrock and that they both sent best regards to the "boys of 1901." We will surely anticipate seeing them at the fortieth reunion, even if they have to fly to get there. Perk (present address, 1991 California Street, San Francisco) also wrote about meeting Jack and, to show how small the world is, stated that one day while driving around San Francisco he happened to park near a young man who was having trouble with his car. In talking with him, he noticed the never-to-be-forgotten Cambridge accent and, lo and behold, found that the young man was one of Scully's sons.

Your Secretary called on Paul Hilken and his charming wife the latter part of May at their new home at Meeting House Hill, North Franklin, Conn. The place and the location are most attractive, and Paul is finding abundant opportunity to make use of his artistic ability in properly landscaping his small estate. We hope, however, that he will have an opportunity to take time off and make us a visit in Hartford. — Fred Clapp is continuing his broadcasts on the subject closest to his heart and, on Monday, May 22, gave a radio address on "Geology and the Search for Petroleum." — Ralph Whitman, who at the time of the last reference had the rank of captain, has now been made rear admiral, United States Navy, in charge of the third naval district as public works officer. The third naval district embraces all shore-station activities of the Navy in the states of New York and Connecticut and part of New Jersey, and Ralph's official address is Federal Office Building, 90 Church Street, New York City. Ralph is now dean of the Civil Engineer Corps and the position which he now holds was previously held by R. E. Bakenhus '96 and A. L. Parsons '97. Those two men were retired, and Ralph states that he will probably be arriving at the retirement age sometime soon. However, he states the navy work is most interesting. If he could write us now since the war has started, he could probably give a number of exceedingly interesting details.

About the middle of June your Secretary was in Newburyport, Mass., and had the pleasure of a brief visit with Walter Davis who is connected with the Towle Manufacturing Company. Walter appeared hale and hearty but is having a little trouble with his hearing; nevertheless, he was very much interested in the recent doings of various members of the Class.

About the time of that visit your Secretary received a letter from Arthur Hayden who lives at 9 Florida Avenue, Bronxville, N.Y., and who, although retired from active business, continues to take a very special interest in engineering subjects. Among other things Hayden is chairman of the New York Engineers' Committee on Student Guidance. He inclosed a very interesting article which he had prepared on that subject and which appeared in the June edition of *Civil Engineering*. The work of his committee is

## 1901 Continued

being publicized as an example for engineering societies in other parts of the country, and Hayden states that it is astonishing how willing some of the really important men in New York engineering and business concerns are to give their valuable time to helping younger men make more of their opportunities. In this connection it is interesting to note again that while Hayden was connected as chief designing engineer with the Bronx Parkway and the Westchester County Park Commissions, he contributed much to engineering progress through the development of the rigid-frame bridge, a new engineering type for short and medium spans. As a matter of fact, more than 1,000 bridges of this type were built in the United States, Canada, Australia, South America, and Europe from 1922 to 1939. The Mount Pleasant bridge in Westchester County, N.Y., is an eminent sample and was awarded the first prize by the American Institute of Steel Construction, Inc., as the most notable short-span steel bridge built in the United States in 1929. Hayden has promised to make us a visit here in Hartford, and we hope to see him sometime soon and also at the fortieth reunion.

The latter part of June your Secretary was in Bangor, Maine, and although he did not have the good fortune actually to see Bill Sweetser, who is in charge of the mechanical engineering department at the University of Maine at Orono (near Bangor), we did have an enjoyable telephone conversation during which Bill definitely stated that he was certainly planning to attend the fortieth reunion. Our class Vice-President, Joe Evans, has written a number of very interesting letters about his doings out in Nebraska and other states in connection with the P.W.A. We wish there were space in these notes to make a much more lengthy reference to his adventures and good works, for he is surely accomplishing a lot of the latter and when he comes to the fortieth reunion he should bring a very interesting story. As a matter of fact, Joe indicated that he might come East this fall. In any event, he wished to be remembered to all the boys.

Al Higgins, President of the Florida Power Corporation at St. Petersburg, spent his vacation at East Gloucester, Mass. He and your Secretary, who spent his vacation at near-by Rockport, had a very good visit one morning, and Al very informatively told of the good work which his company was accomplishing, in Florida and elsewhere, through its various business connections. Some time ago Al had also sent me a special report of a visitation which he arranged for fifty senior engineering students and professors of the University of Florida at the Dunnellon and Inglis generating stations. Al took special charge of the visitations, and if the students and professors did not learn something, it was their own fault. Al also takes a very keen interest in the welfare of all employees of his company and is a great believer in bonus arrangements for special accomplishments along the lines advocated for so many years by

Charlie Schwab of Bethlehem Steel. Al has been somewhat worried about his health but is apparently now on the road to full recovery, so there should be no question of his being at the fortieth reunion.

Lammot du Pont continues to be referred to frequently in the public press. The last reference which I happened to see in the *Hartford Times* of September 12 quoted Lammot as stating that achievements of the chemical industry in the last quarter century had made this country self-sufficient. He stated that "never again will our industrial production which depends upon chemistry be disrupted by wars beyond our shores, and that domestic chemical achievements in the last quarter century stand as a solid guarantee of American self-sufficiency." Du Pont declared that in contrast with conditions during the last World War, the nation today does not rely on imports for nitrates, potash, and materials for producing dyes and that he believed every important American industrial and medicinal need would be filled by American factories, whatever the emergency stemming from the present European conflict. We certainly do not want the United States to get into this war, but it is comforting to have such assurances as to our ability to take care of any requirements.

We are sorry to write that we have recently received news of the death of Gene Foljambe at 2903 Partridge Avenue, Los Angeles, Calif., on December 25. No details were given by the Alumni Association, and we have not been able to secure any further information elsewhere. Foljambe was graduated from the Course in Naval Architecture, as was your Secretary, and we were very good friends while at Technology. Unfortunately Gene's retirement, combined with the fact that he had been living on the Pacific Coast for a number of years, prevented exchange of experiences. Therefore, if any other member of the Class can furnish any additional news regarding him, it will be appreciated.

We are also sorry to announce that through Nat Patch of Buffalo we have learned of the death, on September 4, of George Fisk at 829 Bird Avenue, Buffalo. Fisk took the Course in Civil Engineering and for more than thirty years had been located in Buffalo where for twenty-three years he was connected with the city's engineering department, covering all kinds of positions from draftsman to his final job as commissioner of public works. Since 1936 he had been construction adviser to the United States Housing Authority. Surviving him are his wife, a daughter, and a son. Nat Patch, who, you will recollect, has had trouble with his eyesight ever since his days at the Institute but who cheerfully carries on with his concern, the Lumen Bearing Company of Buffalo, writes that he had a visit from Claude Patch and also from Frank Lane. Nat said that Claude was feeling fine and could not get enough walking; so we suggest that if he cannot reach the fortieth reunion any other way, he might accomplish his aim as a pedestrian.

The Alumni Office has informed us of the death of Samuel F. Rosnosky, 101 Tremont Street, Boston, Mass., and of the following changes of address: Miss Ethel A. Gleason, 73 Prospect Street, Northampton, Mass.; Miss Eloise L. Derby, 383 Marlborough Street, Boston, Mass.; Jeremiah Colman, 993 Memorial Drive, Cambridge, Mass.; and George A. Clark, 3 Adams Street, Medford, Mass. — ROGER W. WIGHT, *Secretary*, The Travelers Fire Insurance Company, 700 Main Street, Hartford, Conn. WILLARD W. Dow, C.P.A., *Assistant Secretary*, 20 Beacon Street, Boston, Mass.

## 1902

Your Secretary was unable to attend the Alumni Day celebration because of absence on business, but through the kindness of Moore, our local Vice-President, we can record the names of those present at the banquet: Ned Baker, Dan Patch, Hunter, Doc Williams, Moore, Grant Taylor, Proctor, and Sawyer. Charlie Porter was present at the morning conference. Since our last class notes appeared, Kellogg has resigned as chairman of the Engineers Public Service Company, as of June 7, to give his entire time to the office of president of the Edison Electric Institute. Kellogg has held this office since 1936, giving it but a portion of his time. The office is now a full-time position and for the first time becomes a salaried position.

On June 10 Jimmie Smith's son, James, Jr., who is connected with the Adams Press in Lexington, Mass., was married to Miss Mary E. Whipple. We have also the pleasure of recording weddings of the sons of two other classmates: On June 2 Miss Lewis Watson of Malvern, Ark., was married to William Jason Mixter, Jr., of Cleveland, Ohio, and on July 21 Miss Elizabeth Long of Chattanooga, Tenn., was married to Roger Conant Mixter, Charlie Mixter's son, who is located in Waukesha, Wis.

Chandler Hovey has been appointed chairman of the Massachusetts Aviation Board. The board is made up of five members and has been formed with the purpose of advancing aviation commercially in the state. — The firm of Moore and Haller was dissolved the first of August, and Moore is back at his old address, 73 Tremont Street, Boston, carrying on his engineering practice. — The Alumni Office has sent us a few changes of addresses: Green, I, has left Washington, D.C., and is now at Quarry Heights, Canal Zone, with the rank of colonel. Charlie McCarthy (Lieutenant Colonel) has a new location at Trenton, N.J., 44th Division National Guard. — Your Secretary's younger son, Richard, entered the University of Chicago this fall. — BURTON G. PHILBRICK, *Secretary*, 246 Stuart Street, Boston, Mass.

## 1904

Another summer has rolled on into the pages of the past; I sincerely hope you all enjoyed very pleasant vacations and returned refreshed and prepared for whatever the more or less uncertain future may



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bring forth. Our Class was represented at Alumni Day by a small group attending the exercises at the Institute. About five o'clock in the afternoon, Munster, Fellows, Ferris, Gene Russell, Zens Roberts, and the Secretary met at the University Club for a session preparatory to attending the banquet at the Hotel Statler, at which we were joined by Hayward and Blum. The occasion was a pleasant one and we enjoyed being together, regretting only that more were not present.

The 35th anniversary of our exodus from the Institute was duly celebrated by the usual three-day reunion, held on June 23, 24, and 25. It started with a luncheon at the University Club on Friday, June 23, at which Thurlow, Rockwood, Fellows, Munster, Parker, Kendall, Gene Russell, Ferris, Sutton, and the Secretary were present. As we always have rain during some portion of our reunion, this year we decided to have it early, and so it was raining hard at about two o'clock when we left the club for Boxwood Manor, Old Lyme, Conn., where the Boston contingent arrived about six o'clock to find that others from New York, Hartford, Pawtucket, and New Jersey had already arrived. The quarters provided for us were fine and the gathering was soon in good form and ready for dinner, which proved to be most satisfying from all angles. Meanwhile the weather had cleared and left nothing to be desired in that line for the remainder of the reunion.

Friday evening was spent, as usual, in reminiscing, yarning, cards, and any other sort of entertainment that occurred to anyone's mind. Needless to say, it was an evening hugely enjoyed by all. Saturday morning dawned bright and clear, and soon after breakfast everybody moved to the golf course; those who did not play, walked around and offered advice to those who did. The course, while short and offering no great difficulties to the experts, proved, like all others I ever played, plenty tough. In the afternoon many went swimming in Long Island Sound, while others explored the near-by country.

Saturday evening the annual class meeting was held, during which letters and telegrams were read from absentees and Ed Parker put on a moving-picture show of past class events. This was the attendance high light of the reunion; the roster was as follows: Fairfield, Roberts and Mrs. Roberts, Fellows, Munster, Jack Draper, Eager, Parker, Kendall, Anthony, Langley, Kalmus, Haynes, Gene Russell, Ferris, Sutton, Guy Palmer, Dennie, Holcombe and Mrs. Holcombe, H. K. Richardson, Lang and Mrs. Lang, Hiller, Chick Emerson, Al Read, Charlie Hoy and Mrs. Hoy, Tripp and Mrs. Tripp, Porter, Frank Davis, Hyde, and the Secretary—a total of twenty-nine classmates, five wives, and Mrs. Holcombe's sister, making a grand total of thirty-five.

Sunday morning was a repetition of Saturday, and the reunion broke up after dinner, with the expression of all present that it had been a grand time and a truly great celebration of our thirty-fifth anniversary. The change in location from Cape Cod to Long Island Sound was en-

thusiastically received, as was proved by the increased attendance. We expect to try this again next year. On the way home the Boston contingent were the guests of Al Read at his home in Pawtucket for a couple of hours. This visit was most enjoyable and, for that favored group, proved a fine climax to a glorious weekend.

I have at present no more class news other than to record the passing of two of our members, always a sad duty: Charles Howard Brigham died in Marlboro, Mass., on February 1. — The following clipping from the Boston *Herald* of September 18 records the death of one whom we all remember very well for his dashing exploits during our freshman and sophomore years. He was a fine example of class spirit and was always in the vanguard of any class activity requiring courage and fortitude: "Major H. Howard Gould, 56, public relations director of the WPA and former city editor of the Boston *Traveler*, died unexpectedly today. Death occurred during his sleep at his home, 17 Lakeside avenue, Jamaica Plain. Major Gould retired as city editor of the *Traveler* in 1933, after holding that post 12 years. Previously he had worked on various Boston newspapers, starting his newspaper career as district reporter. At one time he had been managing editor of the *Daily Record*. He was the son of Howard Gould, actor, who died last year after 40 years on the American stage. His mother was Lena Bugbee Gould.

"In 1904, he was graduated from Massachusetts Institute of Technology, and immediately went into newspaper work. During the World War he served as an ambulance driver with both the American and British forces. Returning to Boston after the war, he continued his military interests. He was given the rank of major in the intelligence division of the Army Reserves, and he served as president of the Military Intelligence Association. Major Gould, a graduate of the Army War College, Washington, leaves his wife; a son, Richard Gould, and a daughter, Miss Rosamond Gould. . . ."

— HENRY W. STEVENS, *Secretary*, 12 Garrison Street, Chestnut Hill, Mass. AMASA M. HOLCOMBE, *Assistant Secretary*, 4817 Woodway Lane, N.W., Washington, D.C.

### 1905

The thirty-fourth reunion at Old Lyme, Conn., passes into memory as one of the most enjoyable ever, even if it did not quite keep up to previous records as to volume of "reuners." Some of the old-timers felt that from a standpoint of fellowship and good cheer it was tops and foreboded the best ever both in quality and quantity at our thirty-fifth next June. Present for the first time at any '05 reunion was Harold B. Harvey, VI, of Chicago. While it was difficult for most of us to place him at once, he showed at the very serious initiation service the regular '05 spirit and was branded promptly as a regular guy. On leaving, he guaranteed to bring a careful of Chicagoans to the thirty-fifth. Mrs. Harvey accompanied Pete and, although properly sequestered at the manor much of the time, was

also dubbed a regular guy and invited to the next. Another old-timer, who had slipped badly in reunion attendance for several years, appeared: Prince Crowell, X. Prince has evidently been dipping regularly in the fountain of youth, as evidenced by his ceaseless energy, athletic prowess, and fund of entertainment. On our return, we delivered him safely to Mrs. Crowell, who agreed he could go again. Thanks, Andy, for delivering the goods. Another comparative stranger was Warren K. Lewis, X. Doc said the story of his hilarious welcome in 1938 was slightly exaggerated, but he did get a good one in 1939 and left promising to persuade Keith, Cowdrey, and so on, that M.I.T. can really get along without profs even at graduation time. Others in attendance were Ball, Barrier, Boggs, Buff, Danforth, Fisher, Fouhy, Goldthwait, Gilman, Johnston, Kriegsmann, Loughlin, McLean, Motter, Robbe, Shapira, Strickland, and Wiggins.

It is difficult to chronicle the high lights. The golf championship seems to be in doubt. Boggs and Strickland challenged Ball and what have you, but Shapira refused to take the blame, saying that Bill didn't get all birdies; so the challengers are probably present class doubles champions. Another "foursome," playing just for fun, consisted of Danforth, Kriegsmann, Shapira, Johnston, Barrier, and Goldie. Charlie won by keeping the ball high on the outside corner. At indoor sports Crowell took all honors, mostly as ringmaster. When he wasn't making his victims walk the chalk line, he had them in paper canoes (three in a boat) paddling up an imaginary Thames River. The committee on hydraulics did their stuff, which made accomplishments of Crowell's stunts the harder. Lacking Marcy, Kenway, and Bridges, tennis didn't even get started. Harvey and Buff "arched" spectacularly, with McLean and Gilman burrowing for the lost arrows.

Ros Davis was absent, the first time he ever missed a reunion that he could have attended! Reason? He was so busy discharging carfare to his home-returning Wesleyan students, or something, that he forgot the first week-end in June. Then after he wrote us that he forgot it, he wrote again three days later that he had forgotten whether he had informed us or not. Your Secretary saw him during the summer, helped Mrs. Davis "rib" him a bit about it, then tied a string around his finger to remind him about June 1, 1940. There is some consolation that he never forgot one while he was secretary.

Jim Fouhy tells us that he was admitted to the Massachusetts bar in October, 1938. Elmer Wiggins told us proudly that the Elmer W. Wiggins airways school has been selected for training government aeronautical students located at M.I.T. Wig promised to send us stories from Boston papers detailing this honor, but we will have to wait for a later issue, as he too evidently forgot. Charlie Johnston bobbed up (still bobbing) from Virginia. He informed us officially that his daughter Marjorie was at about that time being graduated from the Connecticut

1905 Continued

College for Women. Saw Charlie again in Boston the middle of September, attending the meetings of the American Chemical Society at the Statler. That boy surely bobs all over the U.S.A. A letter from George Jones received at Old Lyme as we were sitting down to a lobster dinner said: "I congratulate all of you who turned up at the reunion on being there, and I hope you will all have as good a time as I had last year. I have read Goldie's recent story in *The Review* and understand that you will be kept busy cutting up elm trees for the next two days and have scarcely any time left for a sail with Ray Bell. I hope he turns up this year with more margin of time than last year, although I cannot imagine anyone having a more enthusiastic and hilarious reception than he received last year when he completed the trip from Chicago in 'nothing flat' after we had practically given up hope. In response to Goldie's effective appeal, I inclose a check for \$2.00, for which I demand an immediate receipt and an accounting. If this check is not honored at the bank on which it is drawn, try some other bank. When it comes time to leave Sunday, I recommend that all of you keep your eyes on your baggage, as I remember I came out of the house last year just in time to find Goldie or one of his playmates loading my brief case into the trunk of his car." George's fears about Ray Bell's margin of time was a reminder of sad news, for this year Ray's margin was minus. At the last moment we had a wire from him, saying that he had to go to Chicago immediately in "nothing flat," so the publicized *Yankee* (the '05 flagship) trip was off, and also the famous Ray Bell Saturday night oration. However, Ray's invitation that we hold the 1940 reunion at Bell's roost farm, Sunken Meadow Road, Northport, Long Island, N.Y., surrounded by cows, pigs, goats, chickens, guinea hens, and peacocks, somewhat atones for the loss and is referred to reunion-site committee.

The Saturday night business meeting was turned into a shambles, partly because of storytelling by Buff, Gilman, and Danforth, mostly due to the lack of Ros Davis' dignified awesomeness. Report of the committee on subsidization of 1940 reunion expenses was laid on the table with the suggestion that the Secretary, with the assistance of his w.k. sectional assistant secretaries, be on the alert to find and assist any who would be prevented by financial stringency from attending the thirty-fifth reunion. Some of the foreigners challenged the political machinations of the Boston gang in the election of Sam Shapira as class representative on the Alumni Council, but on assurance from Sam that there was no salary attached, opposition subsided. Moral support, call it sympathy, was given the Secretary in his appeal to get the co-operation of a larger percentage of class members in providing notes for *The Review*. That ought to awake from indifference those who read but do not write.

Here's a man who appreciates the Secretary's plight. Grafton Perkins writes: "Herewith two (2) bucks. I send these

not as class dues but as a fine for not attending the prayer meeting at Old Lyme. Your class notes are very sour. They credit me with but one grandchild, whereas I gave birth to a second six weeks ago. A pity you don't keep up to date, I say." Bill Spalding in wiring regrets from Lubbock, Texas, that his plane reservation for Old Lyme had to be canceled at the last moment, said also: "Hope to meet everyone in New York for lunch any day after next week." Anyone else want to invite us to a reunion? But to return to Old Lyme! Plans for our fortieth were considered and a committee appointed to select the place. However, a tentative reservation for Boxwood Manor, Old Lyme, was made because of the feeling of all present that it had been entirely satisfactory for off-year gatherings. Also, it was decided to hold the fortieth on the week end prior to Alumni Day.

At Alumni Day last June, the Monday following our gathering, were seen Sam and Mrs. Shapira, Fisher, Babcock, Gammons, Tower, Files, McLean, Keith, Chesterman, and Mr. and Mrs. Harvey. Sam had a great laugh on the Secretary because his introduction allowed the Secretary to think he was meeting Sam's mother. Apologies to Mrs. Sam. However, the Secretary argues that it was partly Sam's fault for continuously drinking at the fountain of youth. Gammons rightly bragged that he was our 100 per cent loyal Alumnus, for Herman has two sons and a son-in-law all graduates of M.I.T. At the class day exercises we were reminded that Ralph Whitcomb's daughter Margaret was being graduated the following day with honors. At the Alumni Dinner, we again had the largest representation of any Class (not on a five-year bust) in proportion to our age. Fourteen members overflowed the '05 table to inspire members of nearby classes; in our group were McLean, Chesterman, Charlesworth, Keith, Babcock, Fisher, Harvey, Gammons, Lewis, Wentworth, Marcy, Shapira, Kenway, and Goldthwait. And two of them, Profs Lewis and Keith, Heads of Courses.

Now for some nonreunion news: Carl Graesser has a rival for the quality grandchild class. Andy Fisher has a granddaughter, Carol Elizabeth Hanke, born on August 10. Andy starts with the axiom that because Carol's mother was the A-1 quality daughter of '05, her daughter must be the quality granddaughter. Still Andy admits that Carl has two, which gives him at least a "bit of a bulge." Andy also admits that there are other considerations, for he states (proudly, we know not why) that Sid Strickland has been a grandfather four times. If this doesn't challenge several other grandfathers to furnish news for future issues, our build-up is in vain. Andy does his bit again. Sympathizing with the Secretary's plight, he writes to long-lost classmates. Here's the answer he received from Elbert Fowler, XIII, who hadn't been heard from for thirty-four years: "Was it a treat to hear from you after all these years! Yes, I'm very much alive and always

kicking. Survived '29 by the simple process of keeping on living. Man, you certainly are talking right down my alley when you mention seeing the old boys and yachting on Long Island Sound. I've cruised all those sailing grounds from New Rochelle, Larchmont, Huntington, Mamaroneck, New London, Shelter Island, Peconic Bay, and got stuck in Plum Gut. I still know when to luff and will 'splice the main brace' with any of them. The method is simple: Tip the bottle, throw away the hook gauge, forget the jet contraction, and just let  $V = \sqrt{2gb}$  do the rest.

"Until I received your letter I didn't realize how many of the boys I do remember. Certainly the ones you mentioned and lots of others, Delano, Dickie, Shapira, and, though specials, there were Tom Bedford and Guy Cole — two regulars if there ever were any. Do you remember the time we put the class flag on the telephone cable over Boylston Street from the Brunswick to the Walker Building and almost got in trouble? And when Prince Henry (of Prussia) passed out Boylston Street, and some of us on Rogers steps so far forgot our ideas of international hospitality as to shy snowballs at his topper? Well, now for the sad news — sad for me at any rate. Next year will be the earliest I can get East. Been busy and will be all summer and just can't get away. By next year, we hope to be living in the East again. You've no idea what a 'pull' old New England has for me. They could never make a Middle Western landlubber out of me. Also I prefer sea food to goiter pills. Haven't even had a chance yet to go to see Sessions '26, one of the Alumni here. He is the secretary of my patent-law firm, that is, the firm that is handling some patent work for me. So I suppose I'll have to pay 'em some more money! Give my regards to all the old crowd and tell 'em I'm hoping for better luck next year." Fowler's address is 13324 Forest Hill Avenue, East Cleveland, Ohio. Mrs. Andy says the Secretary's notes do not properly present Andy, but here's saying he's the grandest second assistant class secretary of M.I.T. By the way, only seventy-five men answered the 1939 assessment with the two bucks. Aren't we slipping, especially with the thirty-fifth reunion in the offing? A. T. Hooven, III, in sending in class dues (1939 assessment \$2.00) says that June farming keeps him several thousand miles away from Old Lyme. He wants to be remembered particularly to Bill Gouinlock. His address, Bill, is Arcata, Humboldt County, Calif., just in case. Local newspapers tell us that we have good talent other than that which appears yearly to take a crack at the Old Lyme championship cup. At the last father-and-son tournament in Boston (which includes the top amateurs in New England) we find these records (or are they records?): Henry and Vincent Wentworth, Brae Burn, 86-14-72; P. A. and R. L. Goodale, Woods Hole, 83-9-75. Wouldn't it be great to stage a contest between Harry, Percy, Bill Ball, and other sectional champions in 1940?



1905 Continued

The Secretary's saddest and most difficult job is to write obituaries — saddest because the increasing totals tells us we are losing a lot of mighty fine fellows, difficult because it's hard to get stories from a distance. Arthur H. Abbott, VI, passed away at his home in Winchester, Mass., on August 1. Since the thirtieth-reunion booklet there has been little newsy history on Arthur, as he was on the retired-on-account-of-ill-health list most of the time since then. This extract from a newspaper clipping reminds us of the loss of another good pal: "Funeral services for Arthur H. Abbott, 56, founder of the Boston electrical engineering firm which bore his name, will be held at his home, 27 Lloyd Street, Winchester, tomorrow at 2 P.M. Burial will be in Mount Auburn cemetery, Cambridge. Mr. Abbott, for many years associated with the General Electric Company as a transformer expert, died at his home . . . after a long illness. He was born in Clinton and after attending school there was graduated from the Massachusetts Institute of Technology in 1905. He was a member of William Parkman lodge, A. F. & A. M., the Shriners, the Winchester Country Club, the Boston City Club and the University Club. Surviving are his widow, Mrs. Margia B. Abbott, a son, Allen W., and a brother, Carl P. Abbott of White Plains, N.Y." Doc Lewis, Andy Fisher, and Strickland represented the Class at the funeral services. We acknowledge a letter of deep appreciation from Mrs. Abbott for a floral emblem.

Robert W. Morse, II, died at Washington, D.C., on March 23. Notice of his death came from a business associate. An appeal to our Washington correspondent brought no details. Bob had only recently established his own office (patent attorney). We remember him best as a senior, working over a drawing board in old Engineering B — genial, conscientious, a lovable pal. — C. Arthur Lord, I, died at Providence, R.I., on December 10. Arthur attended the thirty-first reunion at Old Lyme and has been unable to attend any of our gatherings since. Assistant Secretary Dickerman of Providence digs up this report from Phi Beta Epsilon News: "Our good friend and brother, Arthur Lord, passed away on December 10, 1938. He was one of our most loyal members and attended many of our functions. We will all miss him. Art was born in Woonsocket, December 19, 1881, son of Dwight C. Lord and Sophia Cook Lord. After attending school in Woonsocket, he went to Tech and was a member of the Class of 1905. Due to his father's illness, however, he had to leave college in 1903 to enter the firm of Dwight C. Lord & Son, insurance agency. In 1908 the family moved from Woonsocket to Providence and when his father died in 1909, Art took charge of the business. In 1914 he married Miss Wynnifred Wheeler of Rutherford, New Jersey. They had two daughters, Phyllis and Carolyn. At the time of his death, he was Secretary of the Rhode Island Insurance Association but because of his poor

health during the last three years, found it necessary to drop most of his other activities. Although somewhat retiring by nature, Art was always a highly regarded citizen, devoted husband and father, and loyal brother to Phi Beta Epsilon."

Eber L. Blodgett, VI, passed away at Philadelphia on November 23, 1937. As far as reaching the Secretary, bad news seems to travel slowly. Roy Walker, II, tried to get a story, but outside of the fact that Blodgett had been with General Electric in Philadelphia and that they had lost track of him, we obtained no story. — Frederick S. Beattie, V, Lowell Textile School, Lowell, Mass., died on January 11. The ten-year book tells us that he was at one time a clergyman at Charlestown, N.H., but our records for several years have shown him as progressing from instructor to professor at Lowell Textile School. — FRED W. GOLDTHWAIT, Secretary, 274 Franklin Street, Boston, Mass. SIDNEY T. STRICKLAND, Assistant Secretary, 75 State Street, Boston, Mass.

## 1907

Two classmates who were loyal Technology and '07 men have died recently: Robert Eugene Keyes on May 29, and Clarence Ronald Lamont on August 11. Bob Keyes, graduate in Mechanical Engineering, followed the field of heating, ventilating, and air conditioning ever since 1907. He was associated as draftsman, engineer, sales engineer, and chief engineer with B. F. Sturtevant Company, Ilg Electric Ventilating Company, Drying Systems, Inc., Surface Combustion Company, and, at the time of his death, was chief engineer for Cooling and Air Conditioning Corporation at Hyde Park, Mass. He went to Philadelphia on business late in May, caught a cold which developed into pneumonia, and in four days he was gone. His wife, who, as Maud Bingham, was married to Bob on September 8, 1914, hastened to Philadelphia and was with him at the time of his death. Services and cremation took place in that city. A letter of sympathy to Mrs. Keyes from the Secretary brought a cordial and appreciative reply. She is in poor health and since she never had any children, she is particularly lonesome and would, I know, gratefully receive letters from classmates and friends of Bob. Her address is 51 Glendale Road, Wellesley Hills, Mass.

On the evening of June 22, Clarence Lamont gave me a nice surprise by calling me on the telephone at my home from Dover, Mass., where he and his wife had recently arrived after an automobile trip from Los Angeles. We then planned an evening together with our wives sometime this fall; so I was greatly shocked on the evening of August 11 when Oscar Starkweather called me to say that he had just been notified of Clarence's death in Dover on that afternoon. It was not altogether surprising, however, for Clarence had been in very poor health for about two and a half years (see '07 class notes in The Review for July, 1937, No-

vember, 1938, and last February). The final diagnosis was cancer of the chest, and, fortunately, Monty passed on before he had any real suffering. The funeral was on August 14 at Mount Auburn Cemetery, Cambridge, Mass.

For many years Monty was in the general insurance business, in Boston until 1926 and since that time in California. His last connections were with Edward Brown and Sons, a large firm in Los Angeles, but for more than two years he had been unable to carry on his business actively. Monty was twice married. He had four children by his first wife, who died in 1913. In 1916 he married Susan Rice, who has been completely devoted to him during the last five years of financial and health losses. In reply to my letter of sympathy, I received a fine note from Mrs. Lamont on August 19. She planned to stay in Massachusetts for some time, with her nephew in Dover, Mass., and her address is care of R. E. Linnell, Wellesley Press, Wellesley, Mass. Monty's older daughter, Constance, is Mrs. M. E. Linscott of Hallowell, Maine, and the younger, Alice, is Mrs. Henry Becker of San Bernardino, Calif. The older son, John, is assistant metallurgist with Union Carbide and Carbon Company, Niagara Falls, N.Y., and the other son, Benjamin, is in Los Angeles.

Turning from the sad to the glad side of family life of our classmates, the marriage of Lawrie Allen's son, Lawrence Allen, Jr., to Miss Mary Davis of Plymouth, Mass., occurred on September 9. I appreciated receiving a wedding announcement. Young Lawrie was graduated from Dartmouth in 1931; his bride is a Wellesley College girl. The couple are living in Waban, Mass. All three of Lawrie's children are now married. — I also have announcement of the marriage of Vivian Greenidge Noyes, oldest daughter of Erskine P. Noyes, to Carl W. Ackley in Augusta, Maine, on July 15. — Noted in the Boston Herald was announcement of the marriage of Eunice Robinson, daughter of Winslow D. Robinson, to Harold D. Hastings at Lake George, N.Y., on August 28. — Also in a Boston paper, on September 14, appeared announcement of the engagement of Eleanor Rand, daughter of Mr. and Mrs. Robert Rand of Belmont, Mass., to Walter E. Faithorn, Jr., of Chicago. Eleanor was a debutante of the 1938-1939 season and now is a student at Radcliffe College. — Last June, Hal Wonsan, son of our Harold, was elected captain of Dartmouth's 1940 baseball team. Our congratulations to these young people of the '07 family and their parents.

A total of ten '07 men were on hand for Alumni Day, June 5: Leverett Cutten from Allentown, Pa., whose son, William, was graduated from Technology with last year's class, Don Robbins, O. L. Peabody, Ed Moreland, Lawrie Allen, Charlie Allen, Bill Woodward, Ralph Hudson, and Bryant Nichols were on hand for the luncheon and program at Cambridge, and Jim Barker joined them at the evening banquet in Boston. The Secretary also attended the invitation

1907 Continued

dinner for Class and Club Secretaries, Presidents of clubs, and Honorary Secretaries on Sunday evening, June 4, at the Engineers Club, Boston, at which President Compton was host. — Andrew P. Rebori, son of Andrew N. Rebori of Chicago, also was graduated from the Institute last June and had a class day part, but so far as we know, his father was not present on June 5.

Last June, Charlie Allen was elected president of the Worcester, Mass., Area Council, Boy Scouts of America. — From the Alumni office last March came a memorandum stating that the address of James P. Alvey was Dodge Hotel, Washington, D.C. As several letters addressed to Alvey failed to bring any reply, I asked Parker Dodge in Washington to do his best to secure information. After several efforts to see him personally, Parker finally reached J. P. by telephone and learned that he is the budget officer for the Bonneville project and has been for the past three years. Previously he was in the utilities business, being division manager for Illinois Power and Light Corporation at Ottawa, Ill. At the time of the depression he was managing an inter-urban railroad company running out of Chicago, but this folded. Alvey's office address is 6314 New Interior Building, Washington, D.C.

On June 12, Jim Barker was awarded an honorary doctorate of science by Paul D. Moody, President of Middlebury College, Middlebury, Vt. Jim, as you probably all know, is vice-president of Sears, Roebuck and Company.

In the Chicago *Tribune* of August 11 appeared an article referring to a civil aviation conference then being held at Ottawa, Ontario, and a plan permitting American commercial air lines to serve Canadian air lines to make direct connections with Chicago and New York. An important personage in the working out of any such plan is Clarence D. Howe who, by virtue of his position as Canadian minister of transport, is the *de facto* head of Canada's major air-transport company, Trans-Canada Air Lines, because it is a government-controlled corporation. A photograph of Clarence accompanied the article, but you would never recognize our fine-looking classmate.

Carl Trauerman, as president of the Mining Association of Montana, presided at the two-day convention held in Bozeman, Mont., on August 18 and 19. In August, Carl was named supervisor for a mineral survey of Montana to be conducted as a W.P.A. project under the sponsorship of the Montana School of Mines. — Received just too late to get into the July Review was a note from Dick Woodbridge saying that his son, Richard G. Woodbridge, 3d, was graduated from Princeton University last June in the course in chemical engineering. During last school year young Dick was chairman of the board of editors of the *Nassau Lit*, one of the oldest literary publications in American universities. He was also class poet at the class day program. He entered the graduate school

at M.I.T. this fall in Chemical Engineering. — BRYANT NICHOLS, *Secretary*, 126 Charles Street, Auburndale, Mass. HAROLD S. WONSON, *Assistant Secretary*, Commonwealth Shoe and Leather Company, Whitman, Mass.

## 1908

While no special plans had been made for a get-together last June, the Class was well represented at Alumni Day, June 5. The weather as usual was perfect, and we had quite a crowd around our '08 table for lunch in du Pont Court. Cookie, Henry Sewell, Pop and Mrs. Gerrish, Ted Joy, Doc Leslie, Charlie Steese, Toot Ellis, Harry Lord, Nick Carter, Lang Coffin, Miss Cook, and Frank Towle were present. As a result of Pop Gerrish's capturing a waiter, we had wonderful service. The ladies at our table added much to the party, and it is hoped that next year we can do even better. Charlie Steese, who is colonel of ordnance in charge of the New England district, had quite an exhibition of anti-aircraft guns, machine guns, field guns, and howitzers, as well as various fire-control instruments. Furthermore, he very kindly explained how they worked. At the banquet at the Hotel Statler the following were present: Harry Chandler, Charlie Steese, Harry Lord, Nick Carter, Pop Gerrish, Doc Leslie, Frank Towle, Ted Joy, Toot Ellis, and Henry Sewell.

It is with deep regret that we report the death of Arthur A. Longley in Chicago on July 13. He was vice-president and engineer of the Manufacturers Mutual Fire Insurance Company, which he joined after graduation from Technology. We also regret to report the deaths of Howard S. Hazen, Jr., of Sacramento, Calif., on April 13, and William B. Parker, April 15.

Mr. and Mrs. LeSeur T. Collins of Marshfield Hills, Mass., announce the engagement of their daughter, Barbara, to Norman E. Whitney of Newtonville. — At the American Bar Association's meeting in San Francisco in July, Loyd H. Sutton was elected vice-chairman of the patent, trade-mark, and copyright section. — We have the following changes of address to report: Frank K. Belcher, 3710 South Herman Street, Milwaukee, Wis.; Professor Henry W. Blackburn, 615 Fellows Avenue, Syracuse, N.Y.; Claude O. Brown, Southern Kraft Corporation, Mobile, Ala.; H. Ross Callaway, 375 Park Avenue, New York, N.Y.; Rodney C. Caryl, 1535 Aubrey Road, Bend, Ore.; Waldo F. Davis, 54 Beltran Street, Malden, Mass.; Herbert C. Elton, 84 Old Field Road, Fairfield, Conn.; Lewis K. Ferry, 1652 West Housatonic Street, Pittsfield, Mass.; Major Lee Hagood, 120 Broadway, New York, N.Y.; Philip J. Hale, 9208 Woodland Drive, Silver Spring, Md.; Paul H. Heimer, 604 Nottingham Road, Baltimore, Md.; Bradford B. Holmes, 360 East 50th Street, New York, N.Y.; Dr. Eugene C. Howe, Glen Iris, Saratoga, Calif.; Frank E. Ludington, 190 Cutler Street, Watertown, Conn.; Rudolph B. Weiler, 6 Green Tree Boulevard, West Chester, Pa. — H. LESTON CARTER, *Secretary*, 60 Batterymarch Street, Boston, Mass.

## 1909

The thirtieth reunion of the Class was held at the Oyster Harbors Club, Osterville, Mass. (on Cape Cod), on June 3 to 5, with an attendance of thirty-two members of the Class and twenty-nine others, mostly wives and children, a total of sixty-one. This was a very good representation, considering it was not one of the more conspicuous milestones such as the twenty-fifth or fiftieth. The club took good care of us as usual. The golfers were out in force, and a few hardy souls went in swimming on Saturday afternoon. On Sunday the weatherman wasn't so kindly disposed as we wished, but the rain nevertheless made us more willing to stay inside, so perhaps we saw more of each other than we otherwise might have done. On Saturday evening Chet Pope entertained us with beautiful colored motion pictures of trips to the World's Fairs in San Francisco and New York, and Chet Dawes showed us pictures of his summer home at Boothbay Harbor, Maine, and other places of interest along the Maine coast. After the movies some of us played bridge until bedtime.

Sunday was spent principally in visiting. The reunion dinner took place at noon, at which time the Secretary read excerpts from letters received from those who were unable to be with us. We were disappointed that Mollie and Jeanne Scharff and Jim Critchett, who up to the last minute expected to attend, were prevented from doing so. Not until Sunday afternoon did we give up hope that Bill Jones and Jack Moses, who had signed up, would be able to join us. The biggest family delegation was that of the Wallises, George and Marcia, daughters Elizabeth and Frances with their husband and fiancé, respectively — a fine family group. Delos Haynes came the longest distance — from St. Louis. Bill and Marguerite Kelly had the distinction of celebrating their twenty-third wedding anniversary on Saturday, a fact which had been inadvertently overlooked by your Secretary. We were especially glad to have Harvey Pardee and Tom Black, who came on from Chicago, for most of us don't have the chance to see them often; and also John and Mrs. Mills, John McCarthy, Julius and Mrs. Serra, Mrs. Thurston Merriman, and others, who joined us for the first time. We hope they will come again. After dinner, Royce and Victoria Gilbert repeated the movies which were taken at Briarcliff Manor many years ago and which still get a laugh, and Chet Pope took us on a travel-picture trip to South America. Many thanks are owed the fellows who added so much to our entertainment.

By Sunday evening most of the folks had left, although a few stayed over until Monday morning, going to Cambridge for Alumni Day at the Institute. On Monday evening '09 had a good delegation of sixteen men at the Alumni Dinner at the Statler. Ben Pepper, who was unable to get down to Osterville, joined us at this occasion. Joe Parker and Francis Loud drove all the way from Allentown, Pa.,



1909 Continued

and back again, just to spend twenty-four hours with us. We were all delighted to see you two old-timers. It was especially nice to have another old-timer with us again, Ray Temple — also Mrs. Temple, who hasn't been to one of our reunions for years. This year we were happy to meet their daughter Jean for the first time. The Thornleys — Bert and Mrs. Thornley, Albert, Jr., and Ann — had a record attendance of 100 per cent. We were delighted to see you all. — Let King's only daughter was graduated from Swarthmore the same week-end as our reunion, leaving him no choice but to desert us, particularly as Peggy was graduated with high honors.

J. Newell Stephenson had planned for a long time to attend the reunion, but an important meeting at Ottawa prevented him from being with us. — Our long-distance record holder of five years ago, Paul Lord from El Paso, Texas, sent his regrets, saying that for various reasons he couldn't come East this year, but that he and Mrs. Lord are hoping to be present five years from now. — From Mayo D. Hersey came this telegram: "Greetings. Regret traveling. Overlooked questionnaire. Present connection, Kingsbury Machine Works, Philadelphia, manufacturers of thrust bearings. Nothing worth mentioning recently except book on theory of lubrication. Second printing, Wiley, New York. Very dull reading. Recommend instead you read books by my wife, Frances Lester Warner, published by Houghton Mifflin Company, Boston."

It is with regret that we record the deaths of two of our classmates: Matthews Fletcher died in New York on April 18, having gone there for medical treatment which proved of no avail. Fletcher was a student of Courses II and IX. Returning to Indianapolis, he remained there until about 1932, when he moved to Memphis, Tenn., where he was president of the Canal Construction Company. He married Marjorie Leeds of Springfield, Ohio, on October 18, 1911, and had three children.

Austin D. Keables' death occurred on June 16 after an illness of more than a year. In 1936 he had taken a civil service position as chief engineer at the New York State Vocational Institution, West Coxsack, N.Y., an institution for criminal minors. In February, 1938, two of these young inmates, attempting to obtain Austin's keys with which to escape, attacked him in a most brutal manner. He suffered fractures of the skull and other injuries, from which he never really recovered. For a time he seemed to make excellent progress, so much so that he thought he felt well enough to return to work, but that added strain precipitated a condition from which he slowly grew worse.

After graduation Austin was employed for about eight years in the office of John A. Stevens, engineer, Lowell, Mass., as assistant engineer and as resident engineer on projects at Huntsville, Ala., and Little Falls, N.Y. His connection with John A. Stevens was interrupted for a

year when he was assistant mechanical engineer at the Arnold Print Works at North Adams, Mass., and was followed by employment by the Slatersville Finishing Company, Slatersville, R.I., the Boott Mills at Lowell, and the Pepperell Manufacturing Company, Biddeford, Maine, as mechanical engineer, plant engineer, and mechanical superintendent, respectively. For one year he was assistant professor at the Lowell Textile Institute, going in 1928 to Beacon, N.Y., with the Green Fuel Economizer Company, where he remained three years as assistant chief engineer. For the next five years prior to his appointment at the New York State Vocational Institution, he took up the practice of professional engineering. On February 28, 1912, in Lowell, Mass., he married Geneva Mertis Coggins, who survives him, as do his two children, Nelson and Marion. Keables was a member of All Souls Church, Lowell, Mass. — CHARLES R. MAIN, *Secretary*, 201 Devonshire Street, Boston, Mass. *Assistant Secretaries*: PAUL M. WISWALL, MAURICE R. SCHARFF, New York; GEORGE E. WALLIS, Chicago.

#### 1910

It is with deep sorrow that your Secretary must record the passing of Horace E. Stump on July 10, after an operation for appendicitis at the Sharon Hospital in Connecticut. Horace was born in Chicago, May 29, 1888, and was educated at the University High School before entering Tech. He took chemical engineering while at the Institute and followed the chemical lines in his professional career. Since 1931 he had been a chemical consultant and research director for the New England Lime Company with their laboratory at Canaan, Conn. He was married in 1930 to Bertha Baldwin of New York City, who survives him. He was a life member of the Theta Xi Fraternity and a member of the American Chemical Society, the American Society of Mechanical Engineers, and the Technology Club of New York City.

The following members of the Class attended the Technology banquet at the Statler Hotel in June: Jack Babcock, Charles Wallour, Andrew L. Fabens, Alfred I. Phillips, Jr., Gordon G. Holbrook, and your Secretary. Our table also had the honor of two guests who had just received their degrees: Willard F. Babcock and Andrew L. Fabens, Jr. Roy Briggs attended the Technology reunion luncheon but was unable to attend the banquet.

Encouraging reports have been received from Ed Stuart, who for the past ten years or more has been ill with partial paralysis as a result of his experiences in the World War of 1914 to 1918, when he directed the Red Cross antityphus campaign in Serbia. He has now improved so that he is able to get around fairly well. Ed lives at 34 Marmion Way, Rockport, Mass. — The following clippings of activities of classmates and their children have been collected during the summer: Lewis Waters could not come for the annual alumni reunion this year because of

his son William's graduation from the White Plains High School. Young Waters was president of the senior class of 496 members, vice-president of the Honor Society, president of the Phi Lambda Fraternity, and coeditor in chief of the senior yearbook. He planned to enter Princeton this fall. — Miss Frances J. Wallour, daughter of Mr. and Mrs. C. William Wallour of Newton Center, Mass., was graduated on June 8 from the Winsor School. She planned to enter Smith College this fall. — Miss Margaret Cushing Cox, daughter of Mr. and Mrs. James S. Cox of Norwood, was married to Gardner C. Brooks on June 10. The ceremony was performed at four o'clock at the home of the bride's parents in Norwood.

Dudley Clapp's oldest daughter, Frances, entered Smith College this autumn, while his younger daughter, Constance, is attending Putney School in Vermont. — Yvonne Lucy Gibbs, daughter of Mr. and Mrs. Daniel W. Gibbs, was married to Leslie C. Fellows at Christ Church, Waltham, Mass., on September 10. — Cleff Waldo's daughter Elizabeth planned to enter Wheaton College at Norton, Mass., this autumn. — When your Secretary was on one of his frequent trips to Williamsburg, Va., he had the pleasure of the company of Floyd Pitcher from Boston to New Haven. Floyd is chief structural engineer for the New York, New Haven and Hartford Railroad. His description of the havoc wrought on the railroad by the hurricane of last year was most vivid, as we passed by the work that is still in operation to bring the right of way back to normal.

The following clipping was received by your Secretary from John B. Babcock, 3d; it was taken from *Railway Age*: "Barton Wheelwright, whose appointment as chief engineer of the Central Region of the Canadian National at Toronto, Ont., was noted in the *Railway Age* of July 1, entered the service of the Grand Trunk at Toronto in 1911 as a draughtsman. A year later, he went to Montreal, Que., as a signal inspector, and in 1914 he became assistant engineer. Two years later, he was appointed signal engineer, and in 1918, he went to Portland, Me., as engineer maintenance of way. Mr. Wheelwright returned to Montreal in 1920 as engineer accountant, and in 1923, was promoted to special engineer at Toronto. In 1928, he became assistant to the chief engineer, and in 1936, he was promoted to engineer maintenance of way of the Central Region, which position he held until his recent appointment as chief engineer of the Central Region." — A second revised edition of "Elements of Practical Aerodynamics" by Bradley Jones, professor of aeronautics, University of Cincinnati, was published in April.

The following letter was received from H. E. Beebe: "For a long while I have intended to drop you a line. Now that my daughter Beatrice is intending to attend junior college at Auburndale, it brings to mind my delinquency in not writing you before. You will find inclosed the front

## 1910 Continued

page of the Aberdeen daily from which you will notice that, believe it or not, an electrical engineer (at least by degree) is the present president of the South Dakota State Horticultural Society. Financial conditions have not been so good in the agricultural part of the United States, including South Dakota; but there is one thing: We have been receiving plenty of advertising in the *Saturday Evening Post* and the eastern papers, so perhaps when crops do come back, as they promise to this year, Dakota will be much better known and the flow of eastern dollars for investment might spring up again. The last letter for the class notes was probably about six years ago, and since then business with farm lands and rentals has been a roller coaster.

"Personally, I have adhered to a principle, adopted about seven years ago, of spending the money earned as time jogs along instead of always worrying about the future. Five years ago Mrs. Beebe and I spent a very pleasant winter month in the city of Mexico; the next winter we drove to Florida and looked over Havana, Cuba. Everyone busy. On holidays a crowd on the Prado with the raised center section where people could look over the rush of modern traffic without interference. I would favor this in our larger cities as conducive to less circling and more thinking. Last winter we drove to the Mardi gras, a goal for years, had very nice seats in front of the city hall, and were surprised to find New Orleans weather as changeable as South Dakota's. It was an enjoyable experience, and I should like to go again, next time, however, with rooms engaged about two months beforehand to avoid anxiety and high prices. Due, perhaps, to our good-looking overcoats, the last evening we sat next to the mayor of New Orleans in the reviewing stand. After gossiping with the Mexican lady where I negotiated a night's lodging, we arrived at the reviewing stand in time to go counter to the motor-cycle escort that was heading the parade. Perhaps they thought best to get rid of us by putting us up the first stairway in the reviewing stand; anyway, it was a good idea, and we got more than our share of the trinkets that were tossed out from the floats. It is great experience to look up St. Charles Street towards Canal and look at the sea of faces before the mounted patrolmen clear the narrow track for the parade. There is certainly nothing like horses to clear a path.

"From here, over to the Azalea Trail to Mobile, Ala., and back and through Texas to spend a Sunday with Minneapolis friends at Houston, Texas, where the engineering experience has been delightful, for there, partners struck a paying oil field after about twelve years of prospecting. In general I believe Texas showed the most activity of any place visited and more chances for positions to be secured. As far as just living goes, it would be hard to beat Mexico or the Ozarks in northern Arkansas, where we spent a couple of days with friends formerly in the Indian service, on the return trip. The road from Laredo down to Monter-

rey, Mexico, is fine and the week in Monterrey was very pleasant. The cost is low, and the Mexicans favor the tourists and were very obliging. I will long remember Mr. Roderiguez, assistant postmaster, who helped me a great deal with mail in and out on account of my lack of knowledge with Spanish. It is rather interesting that the first South Dakota car I saw after leaving South Dakota and traveling over 3,000 miles was just the morning of leaving Monterrey. The next trip will be to the World's Fair in New York, August 15 to 20, when the daughter plays with the National Music Camp Orchestra of Interlochen, Mich. I often remember the kindness of Dr. MacLaurin and really felt grieved when he passed on. I enjoyed the biography that came out about a year ago. This would be a wonderful country with more people like him."

About a month after the receipt of the foregoing letter, Beebe visited me at the office on one of those real hot days that occasionally come to Boston. I was delighted to think that he would brave such weather to travel Boston streets to call on me. The only trouble was that his visit was too short.

Harry Gard Knox, for the past nine years vice-president in charge of engineering of Electrical Research Products, Inc., a subsidiary of the Western Electric Company, on the advice of his physician, tendered his resignation to take effect on July 15. He plans to take a year's rest, during which time he will, however, be retained by his company in a consulting capacity.

Mr. Knox was graduated from the United States Naval Academy in 1906 and during his eighteen years of service in the Navy received a degree of master of science in Naval Architecture from M.I.T., the degree of master of science in electrical engineering from Union College, and was elected to membership in the honorary scientific society Sigma Xi. At the end of the World War, he resigned the rank of commander in the Navy to join the Winchester Repeating Arms Company at New Haven, leaving there in 1924 to take a consulting engineering position with R. Hoe Company. He left this organization in 1926 to organize the service department of the Vitaphone Corporation for handling installation and maintenance of the Western Electric sound system in motion-picture theaters. In 1927 when Western Electric formed a subsidiary, Electrical Research Products, Inc., to take over the work originally carried on by Vitaphone, Mr. Knox became service manager of the new company. Soon thereafter he went to London to become managing director of the Western Electric Company, Ltd., and served in this capacity for two years, during which time he built up the operating organizations and directed the installation of Western Electric sound systems in theaters in practically every European country. Returning from England in 1929, Mr. Knox became a vice-president of E.R.P.I. in charge of the Western division at Hollywood. Upon the death

of J. J. Lying in 1930, Mr. Knox was transferred to New York as vice-president in charge of engineering. — HERBERT S. CLEVERDON, *Secretary*, 46 Cornhill, Boston, Mass.

## 1911

Congratulations, Bunny and Don, on your elevations to the directorates of your respective companies! Yes sir, the brightest news which has come in these tragic first two weeks of September advised that Irving W. Wilson, XIV, had been made a director of the Aluminum Company of America and Donald R. Stevens, II, of the Okonite Company and the Okonite-Callender Cable Company. Both are vice-presidents in charge of operation, with Wilson located at 801 Gulf Building, Pittsburgh, Pa., and Stevens in Passaic, N.J.

Our participation as a class in Alumni Day made up in enthusiasm and enjoyment what it sadly lacked in numbers. Seven '11 men (how that natural combination persists!) were at the Institute through the day and for lunch on June 5, and eight of us gathered around the festive board at the banquet at the Statler that evening. Jack Herlihy, II, and O. W. Stewart, I, each had sons who were graduated in June, so their wives were at the festivities also. The stags present through the day were Alf deForest, XIII, Tom Haines, II, Morris Omansky, V, Alec Yereance, I, and the Secretary. All of the foregoing, except deForest, attended the evening affair, and George Cumings, VI, and Art Leary, XI, were also there.

Congratulations to John I. Herlihy and Oswald Stewart, 2d, on joining their dads and the rest of us in the M.I.T. Alumni Association. Jack Herlihy received his degree in Business and Engineering Administration and has gone to the Windy City to join the Inland Steel Company, 38 South Dearborn Street. Os Stewart was graduated in Mechanical Engineering and right after graduation joined a party of ten, mostly seniors and juniors, who under the leadership of Allen W. Horton, Jr., '36, made up the M.I.T. personnel of the seventh annual Thorne-Loomis Industrial Tour of Europe. From early June until late August the group traveled by truck across England and Scotland, by boat to Norway, then by truck across Sweden, Denmark, Germany, Italy, Switzerland, France, Belgium, and Holland, and back to England, whence a return passage was made to America just in time, so to speak. Os has gone to work for the Farrel-Birmingham Company at Ansonia, Conn.

Arriving here from Akron, Ohio, with Mrs. Darrow, just too late for Alumni Day, B. Darrow, VI, called on me with his son Jack who this year was graduated from the Babson Institute, Wellesley Hills, Mass. Originally in the Class of 1939 at M.I.T., Jack transferred to Babson's after his junior year. B looked fine and said he was enjoying his semiretirement in Akron in his new home on Yellow Creek Road in the outskirts of the city. The Darrows spent two weeks at North Scituate before returning home.



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It was my extreme pleasure once again this year to be able to accept the kind invitation of the Technology clubs of Hartford and New Haven to be a guest at the annual outing in mid-June. Particular interest for me was added to this 1939 affair because it was held at Riversea Inn at Fenwick Point, Saybrook, Conn. — the scene of our fifteen-year reunion in 1926. Saw just one classmate there — Bob Mather, VI, of Windsor Locks.

Jim Duffy, VI, dropped in on the day before the Fourth and we had a fine reminiscing party. He and I originally came to Worcester together to join forces with the American Steel and Wire Company. Jim is a successful business counselor and certified public accountant at 38 South Dearborn Street, Chicago, and he was on here to see his mother, now seventy-nine years old, and to attend the wedding of his youngest sister in Dorchester at the Duffy home. Jim and his wife, Mildred, who was with him at our twenty-five year reunion, have a fine family of three — two girls, aged eight and a year-and-a-half, and a five-year-old boy.

From Mountain Lakes, N.J., Royal M. Barton, VI, and Mrs. Barton announce the marriage of their daughter, Ruth Ethel, to Herbert James Pyle on June 24. — Don Stevens' daughter, Lois, returned as a junior to Wellesley this fall; my son, Orville, Jr., ditto at Bowdoin; Don's son, Read, enters M.I.T. this fall; my daughter, Helen Elizabeth, ditto at Vassar. Time marches on.

*Mass Transportation* for June contains an interesting major article titled "Transit Facilities in Baltimore — A Model System" and Baltimore is also featured in the monthly section "The Talk of the Town." In the former, our classmate, Ban Hill, I, President of the Baltimore Transit Company, is quoted as follows regarding the \$7,000,000 improvement program involving new cars, new trolley busses, new motor busses and heavy expenditures for shops, track, and overhead lines: "By virtue of this modernization program, inaugurated early in 1937, the Company has kept step with an extensive civic program of traffic and highway improvement in Baltimore. The program has also been a factor in industry's efforts to improve employment conditions. . . . Recent acquisitions include five new 41-passenger Diesel-hydraulic motor coaches and five 36-passenger gas-mechanical coaches in a total of 95 new pieces of passenger-carrying equipment."

The other article states that "President Bancroft Hill came to the old United Railways and Electric Company of Baltimore in 1924 as a valuation engineer. He was trained in steam railroading, harbor development and water supply and his new work led him into a detailed study of all the ramifications of a big city transit system. His viewpoint is a realistic one. He assumed charge of the Baltimore company's affairs early in 1936 and in the ensuing months and years many changes have been put into effect. Outstanding was a new basis of coöperation between the city and the company. . . . Mr. Hill

believes everybody in the boat with an oar to pull ought to be given every chance to pull it as effectively as possible, so in the operating and administrative staff as in the general organization every individual is given the opportunity to use his talents to the limit. President Hill believes in encouraging the utmost curiosity about the business, thus producing not only a better organization but an enlightened and friendlier public. In his own words: 'It is believed these continued experiments in merchandising together with the continued modernization of the company's equipment and routes will ultimately prove helpful in the task of increasing the attractiveness of the company's service.'"

In a recent letter to me, Ban said: "I now and then see some of our classmates, who tell me about the Institute. From what I gather the old place does not seem to be as tough as it used to be." My reply may interest you all: "It appears to me that it is now more difficult to get into Tech and perchance a bit easier to get through, once you're in. This may be comparative, though, because if care is exercised in admitting the best 600 of the more than 1,000 annually applying for admission to the freshman class, that select group should average higher marks and therefore fewer should fall by the wayside. It's still a 'he-man' curriculum, though, I believe."

With regret we announce the death on July 9 in Houston, Texas, of Donald C. Barton, XII, fifty years old, son of our former Professor George H. Barton '80. After receiving his A.B. from Harvard in 1910, Barton did a year's postgraduate work in geology with our Class. Thereafter he returned to Harvard for his A.M. in 1912 and his Ph.D. in 1914. It was my good fortune to see him on a couple of my trips to Houston as alumni secretary; he always seemed interested to hear what was going on.

The *New York Times* obituary stated: "After completing his graduate work, he spent two years teaching geology at Washington University, leaving that post to become a field geologist for the Empire Gas & Fuel Company. In October, 1918, he entered the army, serving overseas in the meteorological division, finally being commissioned weather forecaster for the A.E.F. and later for the Army of Occupation in Germany. After the war he resumed his petroleum research career, serving large firms in consulting capacities. For a number of years he had been the research and consulting geologist and geophysicist for the Humble Oil & Refining Company at Houston. Earlier this year he had been chosen president of the American Association of Petroleum Geologists. He had written many papers on geology and geophysics and was a member of the American Institute of Mining Engineers; American Association for the Advancement of Science; Boston Society of Natural History; the American Meteorological Society; the Society of Petroleum Geophysicists; and the Institute of Petroleum Technologists of London." — The collective sympathy of the Class has

already been expressed to his widow, the former Margaret D. Foules of Lafayette, La., and to his daughter, Miss Ann Foules Barton of Houston.

Did you notice in the July issue of *The Review* the candid-camera shot of Gordon Wilkes, II, director of Technology's heat measurements laboratory, shown at a bench in the new lab quarters in the new Rogers Building? If you missed it, look for it at the foot of page 412 — a fine photo of a fine fellow! — Jim Campbell, I, of Eadie, Freund and Campbell, consulting engineers, 110 West 40th Street, New York City, wrote recently that he has lunch now and then with Phil Caldwell, I, who now lives at 416 Fowler Avenue, Pelham Manor. — Charlie Locke '96 advises that patents on alloy steels have been recently granted to M. A. Grossmann — old Aurora Borealis himself — of Carnegie-Illinois Steel Corporation, Chicago. — I heard through my Beta Fraternity news letter that Roy Van Alstine, I, is serving as consulting engineer for the Long Beach, Calif., harbor commission. He can be reached at 410 East 9th Street, Long Beach.

Here in Worcester it was grand to learn in late August that a \$380,000 contract had been awarded by the United States Navy Department to the Riley Stoker Corporation, which Fred Daniels, VI, heads as president. The contract calls for boiler equipment and accessories to be installed in vessels and land stations on the East Coast. Incidentally, Fred's young son, Bruce G., is following in dad's footsteps, being enrolled this fall as a member of the freshman class at Worcester Academy. He played baseball, basketball, and football at Bancroft School here in Worcester, where he was graduated last June. — Hal Robinson, I, continues as secretary of the Worcester planning board and was chairman of the October 20th annual convention of the Massachusetts Federation of Planning Boards, which took place in Worcester.

From the Alumni Office we learn that Louis Grandgent, IV, has left Norris, Tenn., where for years he has practiced architecture, and is now in Washington, D.C., with the United States Housing Authority, North Interior Building. Jack McAllen, III, has left Seattle, Wash., and is now at the Willow Creek Mines, Lucky Shot, Alaska. — Please don't forget that resolution I asked you to make right after Labor Day: Write to Denniel — ORVILLE B. DENISON, *Secretary*, Chamber of Commerce, Worcester, Mass. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford, Mass.

## 1912

We had two proud fathers at Commencement last June: Randall Cremer and Jabez Pratt, with their wives, came to see their sons receive diplomas. — At the banquet, the following 1912 men were present: Schell, Hunsaker, Lenaerts, Cremer, Golson, Pratt, and Shepard. — Lester G. Metcalf, II, has been appointed manager of marine operations for the Union Oil Company in Los Angeles. — Charles V. Reynolds, XI, is a member of

1912 Continued

the Massachusetts Emergency Public Works Board and has had the handling of \$50,000,000 worth of public works contracts during the past year. The board has been highly commended by the press for the manner in which they have handled these funds, as they have insisted on a dollar's worth of work for every dollar expended.

Louis Grandgent, IV, is now regional technical adviser, United States Housing Authority (Southwestern region), stationed at Washington, D.C. — Johnnie Noyes sends in the following in reply to a request to Mrs. Noyes for an account of her recent travels: "As Mrs. Noyes will probably not be back in Dallas until after the twenty-fifth, when you state the notes are due, I will pinch hit, but I believe she now qualifies as just as extensive a traveler as myself: During the past few months she not only had the New England trip and the very happy visit with you and Mrs. Shepard, but she has also visited San Francisco, Los Angeles, Mexico City, and is now on the Minnesota trip. In Los Angeles we had a very delightful visit with Mr. and Mrs. William C. Lynch and their fine family. Bill and I got a little bit up to date on some of the other 1912 men. Bill has now lived in southern California long enough to qualify fully as a grade A, class 1 member of the local chamber of commerce.

"On August 25, our oldest daughter, Lillian, who was graduated from Radcliffe two years ago, got her master's degree in government at Southern Methodist University here at Dallas, and on the same evening our oldest boy, Baldwin, got his B.A. degree, majoring in mathematics. Jonathan, the second boy, is returning tomorrow to M.I.T., where he starts his sophomore year there, having come through the freshman grill in good shape. Our fellow classmate, John P. Minton, is now located here in Dallas in charge of the geophysical exploration department of the Magnolia Petroleum Company, and his family and the Noyeses have an occasional Sunday picnic together. There certainly must be other roving 1912 men who get down to the Southwest section, and we certainly will feel slighted if they do not give us a ring. I will turn your letter over to Mrs. Noyes on her return, and I am sure that real news will be forthcoming for the future issues." — FREDERICK J. SHEPARD, JR., Secretary, 125 Walnut Street, Watertown, Mass. DAVID J. McGRATH, Assistant Secretary, McGraw-Hill Publishing Company, Inc., 330 West 42d Street, New York, N.Y.

## 1913

Bill Brewster wrote in June: "There were eight stalwarts who turned out for the Alumni Dinner on June 5; by name: George Clark, Wardwell, Sage, Waterman, Capen, MacKinnon, Townsend, and myself. Needless to say, we all had a darn good time and gave a cheer or two for the good old Class of 1913. Not being strong numerically, we enlisted the aid of two tables of 1939 boys who were sitting near us when we gave the yells and then, being

generous, rewarded their efforts with a little extra beer from our table to theirs. We were all sorry that Charlie Edison could not get to the ceremonies. We had worked up a little recognition of his service to the country and the honor which he was reflecting on our Class. The boys there have all chipped in a little, and Rusty Sage is having one of the mugs which we all had at the dinner suitably marked to send along to Charlie.

"Max Waterman and I, in particular, enjoyed these events since we both had boys graduating — and they both did graduate — with the Class of 1939. Incidentally, both boys also sailed with the group going on the Thorne-Loomis tour, and I saw Max at all the ceremonies not only in Boston but on the S.S. *Queen Mary* in New York just before sailing. We were all very sorry that you could not be there, and all the boys send you their best wishes. I hope that you are coming along, but don't try to come too fast. Be sure that you take care of yourself. I suppose you know, too, that Bill Ready has had a touch of angina and he has had to go pretty carefully."

Bill Ready wrote in June: "They laid me out flat and kept me on ice for quite a while, but they do let me circulate a little at the moment." May you continue to circulate, Bill, for a long time yet, to enjoy the rewards of an industrious and useful early career! — Larry Hart, said the New York *Herald Tribune* of June 29, was inducted into the Johns-Manville Quarter Century Club. Larry is general sales manager of the building materials and general department. His associates, one hundred strong, at the Biltmore Hotel, gave him a rousing party and a beautiful watch. At the dinner Larry got some three hundred telegrams from his salesmen and customers. A grand tribute, Larry; we're proud of you!

Kinsley Dey passed away at the Newton, Mass., Hospital on June 13 in his 46th year, following an appendix operation. He left Mrs. Dey, a daughter, and two sons, to whom the Class extends deep sympathy. We were fortunate to have Kin with us at the 25th reunion, last June, and we shall miss him.

From the May 20 *Bulletin* of the Engineering Association of Hawaii we have the following, concerning F. Q. Gardner, VI: "Denying authorship, because of the inclusion of the first word in the title of his talk for last Friday's meeting (May 12), 'Interesting Sidelights on a Mainland Black-out,' Brigadier General Fulton Q. C. Gardner '13 yet lived up to every letter of the immodest little word. He described with much clarifying detail the defense exercises carried out last October around Fort Bragg, N.C. The exercises included a considerable portion of the northern section of North Carolina. They were primarily a test of the effectiveness of anti-aircraft artillery. The black-out, not thought of until after the exercises had been planned, came as a secondary feature. However, as a test of citizen loyalty and citizen co-operation it was of primary importance. The exercises included

many difficult problems, especially in the field of communications, searchlight control, and the setting up of a warning net. The latter included an area 250 by 150 miles extending over twenty-nine counties with over 300 observation posts manned by civilians — 'embattled farmers,' as General Gardner was pleased to call them. It was their job to listen for approaching bombers and to report them immediately, which they did with an average speed of less than two minutes per message. In the black-out the personnel of the warning net was employed."

Concerning Marion Rice Hart's 30,000-mile cruise, the New York *World Telegram* of July 12 had this to say: "Mrs. Marion Rice Hart, a cool, calm-eyed woman in a navy blue dress and brown sandals, wearing neither hat nor stockings, dismissed the taxi at Duffy's Landing, below Riverside Dr., opened a little gate and led the way along a narrow dock and over a rope onto the deck of her good ship, the *Vanora*. This is the 70-foot fore-and-aft rigged vessel which this slender sprite of a ship owner navigated on a 30,000-mile cruise around the world. In another minute we were below deck, Mrs. Hart stepping down sailor-fashion, and were seated in the comfortable saloon that for two and a half years had been her living room, the walls bright with books and fantastic mementos from the ends of the earth.

"The only time I really was frightened on the entire trip was when we were coming into New York harbor," she said. "Those tugboats and the long strings of scows would have scared me in earnest if I had been at the wheel. But I'm the kind that let others do the hard work in a pinch. It certainly was more frightening than the Red Sea or Port Said or the Straits of Magellan, though we did have a terrible storm there."

"The brisk little navigator of all the world's oceans is glad to be back in New York; glad, too, to be anchored near the Drive, where she used to tear along on a motorcycle with her sister after school. She suspects that the noise the two girls and four boys made prompted their mother, Julia Barnett Rice, to found the Anti-Noise Society of America. Her father was Isaac Leopold Rice of New York and Deal, N.J., a pioneer in the storage battery business and inventor of submarine and torpedo boats. They had a big house at 89th St. and the Drive, where international chess matches used to be played.

"All my life I've wanted to do unusual things," Mrs. Hart said. She remembers that her parents were surprised when she insisted upon leaving Barnard College and going to the Massachusetts Institute of Technology. "But I convinced them that courses in chemical engineering would be the thing for me." She got work with the General Electric Co. in Schenectady, married a mining engineer, lived for years in Arizona and California, went abroad occasionally, but never liked big ships because the uniformed bellboys were too impressive.



1913 Continued

"She got a divorce, studied wood sculpture in London and settled down with two French servants in a garden cottage near Avignon, ancient city of the popes. The late William Bolitho, New York writer, and his wife were her neighbors. She had been there for six years when she suddenly decided to buy a second-hand ship and go to sea. She said that, for all her love of splashy landings and slippery planks, she had no advance inkling of the walking she would have to do while shopping at Cannes, Cowes and New York for a couple of years before she could find a 'sufficiently tough-looking' craft. She wanted a taste of a rover's life, with the wind and spray in her face, white sails unfurled. 'The paint was peeling off her, and she had a lot of rust. Instead of spending a few extra thousand dollars on remodeling, I got some artist friends to come to Cowes and help me. We chipped off the rust and did all the painting and had a wonderful time. . . .'

"Drunken sailors were her worst worries, she said. On the way to the Antipodes, through the Red Sea and Indian Ocean, she fired several captains and navigators before she became her own navigator. 'I didn't mind a little drinking if they did their work. But I had five men and my young nephew, a boy of 15, Paul Perez, who left school in England to come with me, and I couldn't let drunkards endanger their lives. I'll never forget the seaman in Port Said who told me that if I could navigate the Red Sea I'd get around the world all right. Being at sea in her own ship gives a woman a wonderful feeling of freedom. On the way back from New Zealand I never was afraid for a moment — not after Duncan Mattheson came on as captain. The cook who shipped with me from England is here with me. He solved our food problems, because at any port he could swear in several languages and buy whatever we needed. I never had known just how useful a swearing vocabulary can be.'

"This week Mrs. Hart is parting with her sailors and trying to sell her ship. She wants to live in New York for a few weeks. But not even her sister, Mrs. Harold Sims, with whom she is visiting, could get her to wear stockings again. Not in summer, anyway." — FREDERICK D. MURDOCK, *Secretary*, Murdock Webbing Company, Box 784, Pawtucket, R.I.

## 1914

Back at the same old stand, but thoroughly reconditioned. You read in the last notes that your Secretary was firmly convinced that a change was in order to bring to these notes, and to class affairs in general, a fresh point of view. This was written in all seriousness, sincerity, and with a firm determination to make the resignation at our reunion stick. By now most of you know the result. Since those who were present insisted otherwise, there remains nothing left for your Secretary to do but to carry out your wishes with a renewed vigor and a determination to bring about the changes he felt desirable by means other than resignation.

With the complete surprise at its presentation, coupled with the effort being made at that moment to resign, your Secretary could only inadequately express his appreciation for the beautiful silver cigar and cigarette box with which you presented him, and should like to take this occasion to express to you all his deep appreciation of your loyalty and thoughtfulness. The delightful inscription on it will ever prove an inspiration for future efforts in the secretaryship. Now, on to the reunion.

As you all know from the prereunion issues of the *Fourteen Pointer*, the reunion program of the twenty-five year Class requires certain modifications so as to conform to the general Alumni Day program. There were some misgivings among a few of the Class as to how our reunion program was going to work out, but now that it is past it may be safely said that any such misgivings were dispelled. We had a great time, a record attendance, and, as Dean Fales added at the conclusion, "grand, and we are again ready to 'resume speed.'" The advance guard met at Swampscott on Friday evening, June 2, to get in trim and to greet the New York contingent who had been marshaled for the trip by Paul Owen. This greeting proved a complete failure. Because of the Eastern Steamship Company strike, the New Yorkers came by train instead of by boat. Ted Gazarian met them at the station with a bus and sped them — so he thought — on to Swampscott, where the greeters armed with Roy Parsell's saluting cannon awaited their 11:45 p.m. scheduled arrival. Came midnight, twelve-thirty, one, and still no bus. A telephone call to Boston assured the greeters that the train had arrived on time, and the police reported no bus wreck. Slowly the light dawned, and with subdued spirits the greeters retired to await a new day. All hands, including the New Yorkers, were on deck for breakfast, and the forenoon was spent with the greeters enviously hearing of the grand party they missed "somewhere up the road."

Saturday afternoon was one of those days made just for reunions. Thirty-two tried their luck on the Tedesco Country Club's sporty course; others practiced on the short course at the hotel, tried tennis, pitched horseshoes; some joined the ladies on their cabin-cruiser trip from Marblehead to Gloucester; and some just sat. Charlie Fiske, Gardner Derry, Malcolm MacKenzie, and Harry Wylde, who is a member of Tedesco, were in charge of golf. They ran it with a precision and humor that was a joy to all. A record of the tournament was prepared, but lest Freddy Karns, Walt Keith, your Secretary, and a few others blush with shame if it were published, it will simply be placed in the class files without further comment. But those men of skill at the other end of the list should be heralded far and wide. Low gross of 87 was made by Jim Reber, which entitled him to six golf balls, and next was Fay Williams with 91, which netted him second prize of three balls. With a 73 and 76, respec-

tively, Reber and Williams placed first and second for low net, but under the rules of the tournament no man could win two prizes. The low net, accordingly, went to Fred Bommer with a 79, and to Chet Corney with an 80. The prizes were the same as for low gross.

In the kickers' handicap the first number drawn was 77, for which Herman Affel and Tom Richey tied. On the draw Affel won, entitling him to a brief case, and Richey received a set of four transportation prints. The next number to be drawn was 79, for which Dawson, Kerr, and McLeod tied. On the draw Skip Dawson won and received a dozen golf balls. Norm McLeod won the hat pool, and graciously turned the whole proceeds over to the Alumni Fund to assist in building the new swimming pool at Technology. The conclusion of the golf tournament was saddened when we learned on returning to the hotel that word was awaiting Chet Corney that his father had died during the afternoon.

As usual, the high light of the reunion was our dinner Saturday evening; the ladies held a separate dinner of their own. The enjoyment of this dinner was materially enhanced by the generosity of our president, Buck Dorrance. In keeping with the general spirit of the reunion this dinner was strictly informal. A song sheet had been arranged by Chet Ober, and Vern Tallman led the singing. Roy Parsell gave an illustrated talk on queer patents actually issued by the United States Patent Office, and thereby increased our knowledge on matters of which we knew not, while at the same time provided us with many a laugh. Harold Wilkins arranged a movie program showing the twenty-year reunion pictures made by Affel, and also a reel on Technology dinghy sailing. Charlie Fiske's remarks in connection with the golf-prize presentations were right up to Charlie's own inimitable style. We also enjoyed a few brief remarks from Porter Adams.

In keeping with the indomitable spirit he has always shown during his illness, Adams, after a three months' stay in a hospital, drove his own car to the reunion, and although in continuous, severe pain planned to take part in the general activities. While at Swampscott he collapsed from overexertion and in the fall fractured his hip, thus again returning him to the hospital for another long stay. In the earlier days of our class history it was Adams who initiated many of the enjoyable events we held. He provided the airplane at our sixth-year reunion (really our belated fifth), the submarines at our tenth, and in many ways has been benefactor to our Class. It grieves those of us who have known him intimately to see him the victim of so much suffering through these recent years, suffering which forced his resignation this June from the brilliant work he was doing as president of Norwich University.

Roy Parsell had the opportunity for which he was waiting on Sunday morning. It took many rounds from his cannon

1914. Continued

to get the gang out for the softball game, but just as practice was getting under way a heavy shower broke, forcing the abandonment of outdoor activities, much to the disappointment of Bill Simpson and the other softball fans. Third base was moved into the hotel, where "Head Clear as a Bell," by Charlie Fiske, and other Fourteen classics were retold and a whole new library by Ross Dickson, Ray Dinsmore, Dean Fales, Boggs Morrison, and many others added. By afternoon the skies were clear and golf again got under way. Several left at the end of the day to attend Dr. Compton's dinner to Honorary Secretaries and Class and Club Secretaries, while a few had to start their way homeward. Those who remained at Swampscott will long remember the pleasant impromptu party at which Vern Tallman acted as most gracious and generous host.

The Alumni Day attendance was grand. Every '14 man who possibly could do so stayed for it, and a few who could not make the reunion came to Alumni Day. Your Secretary is especially appreciative of this support because of his official connection with Alumni Day. During the class day exercises Charlie Fiske gave the words of wisdom and advice of a twenty-five year graduate to the new graduates, and as you would expect did a whale of a good job. Your Secretary also took part in this class day program, and in the dedication of the new Briggs Field House. In the late afternoon Art Peaslee was host to a group of '14 men at the Ritz-Carlton, the minutes of the meeting being taken by Vern Tallman.

Not only because of their places of honor in front of the head table but also because of their numbers, the arm bands each wore, and their enthusiasm, the members of the Class were in much prominence at the evening dinner. This occasion was taken to initiate Dr. Compton into the Class as our honorary member, and by virtue of having passed the tests with credit, and by the wearing of the class numerals on his hat during the evening, he has been duly notified of his election, and an enthusiastic acceptance was received from him.

On Tuesday at Commencement, Charlie Fiske and Leigh Hall were the two official representatives of the twenty-five year class in the academic procession. Leigh Hall received the honor by virtue of being the first '14 man to have a son graduated from the Institute — Leigh, Jr., receiving his degree that day. Through their positions as term members of the Corporation, the Class also had representation in Buck Dorrance, George Whitwell, and your Secretary.

Such a complete program required an enormous amount of preparation, and your Secretary regrets that his Alumni Association duties took so much of his time that he was unable to help as much as he would have liked in our own program, but the committee did such a fine job that little remained to be done. Ross Dickson, we salute you! The endless hours you put in, the supreme handling of infinite details, have secured for you a

place of esteem and gratitude in the hearts of your classmates. To Buck Dorrance for his leadership, encouragement, and organization aid, all at a time when under great pressure because of the serious illness of his son, the whole Class joins in tribute. Charlie Fiske, the ubiquitous! Everywhere — always — suggesting, aiding, doing. Likewise to all committee members are thanks due, and in addition to those names already mentioned earlier in this report special mention should be given to Mr. and Mrs. Atwood for organizing the ladies' events and for prizes contributed, to Ted Gazarian for prizes and for his work on transportation, Harold Wilkins and Harry Wylde on housing and arrangements, and Corney, Crocker, and Fox for the special work assigned to them. Herman Affel and Bob Townend took pictures of many interesting moments. For anyone who desires prints Affel has arranged the collection in three groups of ten, twenty, and thirty, which can be supplied at \$.50, \$1.00, and \$1.50, respectively, thus making it possible for anyone to have the full set of thirty or just a few for reminders of the pleasant occasion. Herman's address is 827 Morningside Road, Ridgewood, N.J.

The exact roster of attendance, particularly of guests, may never be complete, but so far this is what the record shows. Your Secretary would appreciate hearing of any omissions: Porter H. Adams and wife; Herman A. Affel; Frank L. Ahern, wife, and sons Frank and Dick; Halford A. Ambler; F. Clarke Atwood and wife; Roswell F. Barratt, wife, and son Grant; Nelson E. Baxter; Fred W. Bommer; Howard G. Borden; Henry T. Chandler and wife; Tom L. Chase; Charles H. Chatfield; Ormonde C. Clisham; Chester A. Corney, wife, and son; Alden Crankshaw; Ernest C. Crocker and wife; Phil M. Currier; Chester P. Davis; Elmer E. Dawson, Jr.; Gardner C. Derry; Donald Des Granges; Alfred W. Devine; Ross H. Dickson; Ray P. Dinsmore; Donald R. Dixon and wife; Arthur C. Dorrance and wife; Levi B. Duff; Thomas J. Duffield; Frank E. Dunn; Walter C. Eberhard; Dean A. Fales; Linwood D. Faunce and wife; Charles P. Fiske; Charles E. Fox; Victor J. Galleni; Chester R. Gardner; Hampar T. Gazarian; David F. Gould; Egbert C. Hadley; Herbert H. Hall; Leigh S. Hall, wife, and son Leigh; Oliver C. Hall; Leicester F. Hamilton and wife; Alfred E. Hanson; Roy E. Hardy; John W. Hines; Frederick P. Karns; Harry M. Keating; Walter P. Keith, wife, and son Walter; Ernest Kerr and wife; Alexander G. Long; Raymond D. MacCart; Malcolm C. MacKenzie; Norman D. MacLeod; Robert A. McMenimen; Ernest W. Mann; Karl C. Mason; Dana H. N. Mayo; Earle A. Mitchell; Howard A. Morrison; Edward E. Murphy; John P. Newbury; Warren C. Newbury; Chester A. Ober; M. I. Omansky; Paul B. Owen; Arthur S. Page; Roy L. Parsell; Arthur F. Peaslee; Ralph H. Perry; George K. Perley and wife; Arthur F. Petts; James B. Reber and wife; H. B. Richmond, wife, and daughter Priscilla; Thomas B. Richey, wife, and son Tom; Philip L. Scannell;

Duncan Shaw; William A. Simpson; Clarence L. Smith and wife; Seymour J. Spitz; Starr W. Stanyan; Arthur R. Stubbs; Angus V. Swift; Vernon M. F. Tallman; Robert V. Townend; Russell A. Trufant; Frederic J. Van Etten; Alden H. Waitt; Leo F. Walsh; Edward C. Wente; George E. Whitwell; Charles H. Wilkins; Harold S. Wilkins; Fay W. Williams; Louis A. Wilson; and Harry M. Wylde. At the Alumni Day Dinner we were joined by our honorary members, Frederick G. Keyes and Earl B. Millard, while William Jackson was at Swampscott in addition to being at the dinner.

Ernest L. Osborne had signed up but was unfortunately obliged to telegraph his regrets because of illness which developed in his family. Several classmates who found it impossible to attend sent greetings, one of the most spectacular of which came via amateur radio from Chang, Hsin, and Hsu in Kunming, China. Long-distance honors went to Alden Waitt, who flew from Montgomery, Ala. Ray Dinsmore and Walt Keith journeyed from Akron; Baxter from Peoria, Ill.; Long from Elmira, N.Y.; and a sizable group from the Pennsylvania and District of Columbia areas.

After the reunion your Secretary made a brief trip to the Pacific Coast, and while there spoke before the Los Angeles and San Francisco Technology clubs. In the former city it was a pleasure to be greeted by Thorn Dickinson and Jim Holmes. Carl Sanborn was unfortunately prevented from attending because of a conflict in the date with that of an important Masonic meeting in which he was taking part. Holmes is a veteran West Coaster and is well established in the contracting business, as is also Sanborn. Dickinson is only temporarily there in connection with a traffic survey being made by Stone and Webster. A call was made on Don Douglas at Santa Monica. Don's plant is one of the big enterprises in the Los Angeles area and is a perfect hive of activity.

The meeting at San Francisco was ladies' night, and Deac Barns, Charlie Maier, and Standish Hall were on hand with their wives. Barns, who is vice-president of the San Francisco Club, acted as your Secretary's escort around the city. It was an especial pleasure to see Hall, because he is just getting around again after a long heart illness which had confined him to his bed for about six months. He still has to be very careful, and we all wish him Godspeed to good health again, which we know is going to be greatly aided by his helpful and delightful wife. Hall is hydraulic engineer of the East Bay Municipal Utility District at Oakland. Maier is with the United States Bureau of Mines at Berkeley, and Barns with one of the government West Coast projects.

As if Leigh Hall did not have enough honor in having his son be the first son of a '14 man to be graduated from Technology, his daughter, Frances Annette, was married in June to Dr. John Snodgrass Lyle. Have any other '14 men had sons or daughters who are married? If so, please



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let your Secretary know about them so that the record may be straight. — H. B. RICHMOND, *Secretary*, General Radio Company, 30 State Street, Cambridge, Mass. CHARLES P. FISKE, *Assistant Secretary*, 1775 Broadway, New York, N.Y.

## 1915

boom!! Boom!!!! BCOM!!!!!! What's that distant rolling rumbling you hear? Is it artillery bombardment? NO! It is the roar of our TWENTY-FIFTH REUNION!

Only 220 days left to the big event. A general committee in Boston has been formed and held its first meeting on September 29; you will soon receive your first publicity on our coming reunion. In addition, keymen have been appointed in geographical centers throughout the country to contact the men in their contiguous territory. The success of the reunion depends on the co-operation, efforts, and support of all our classmates. The committee cannot do the work alone. Our principal aim is to secure the largest possible attendance (thereby shaming the vaunted records of 1913 and 1914) and to give everyone the best time possible.

As to class dues, one hundred men paid \$374.50, an average of \$3.75 per man and 20.5 per cent return from the entire Class. This is an all-time high in dues collections, and I most heartily thank everyone for his generous response. Of course, if you haven't already mailed me your check, it is not too late when you read these notes. Long-distance prizes for dues payments go to Harvey Daniels in Yokohama, Japan; Stanley Baxter in Chile, South America; Charlie Bouchard in Brussels, Belgium; and Ken Boynton in Mexico City, Mexico. The choicest response is undoubtedly Mary Plummer Rice's sweet letter: "I am inclosing check for class dues. The only news that I have to announce is the arrival on May 26 of a grandson, Robert Kidder Badensten, Jr., at the Harkness Pavilion in New York. My daughter and her husband are studying at Columbia — she, theater work, and he a business course after being graduated from Amherst a year ago. With kindest regards for members of the Class whom you meet." Now, isn't it nice that Mary remembers us all so well? I am sure as a grandmother she is just as gracious as ever. I suppose this is the first class grandchild. The old notes show a deluge of marriage announcements shortly after 1915 subsequently followed in due course by baby announcements and now come the wedding announcements of these same babies. Mr. and Mrs. Virgil Wardwell's daughter Katherine Darling was married to Paul Nason Taylor in Glenbrook, Conn., on June 24. Our blessings to the bride and bridegroom!

After a famine in class notes we are now gorging ourselves with a feast, for I have many and varied letters for you. What better letter first than Lucius Bigelow's taunting note: "You may have a check and no letter or no check and no letter. What did you say? Yes, I will send the check and maybe a letter will come later." This is written from 131 Pinecrest

Road, Durham, N.C.; Lucius is undoubtedly still at Duke University. If he ever dares to answer the letter I wrote him, we shall have something good in the future notes. — Charlie Bouchard wrote from Belgium: "This is a lousy letter to write to anyone who is in a different foreign country every week and gets mail only about every month. Then again I don't have a check account. So you will find inclosed a check I bought from a bank. More horsepower to you."

From Harvey Daniels in Yokohama: "I have just received your letter of May 15, together with your personal note. Rather than put it aside to answer at leisure, I am obeying the urge to give it immediate attention. My check is inclosed. I am pleased to kick through and at the same time take the opportunity of expressing the appreciation that I have for the good job you have been doing as Class Secretary and the unfailing interest which you have given the job over the years. I always start reading *The Review* in Japanese fashion, that is, from the back pages (where I find the class news) toward the front. It is always disappointing when 1915 is among the missing. As you know I am still residing in the Orient and for most of the last thirteen years have been a resident of Yokohama. My business connections and my family status remain unchanged since last reported. The two boys are students in the U.S.A., one at Dartmouth and the other at Deerfield. I am soon returning to the United States for a six months' furlough and will be in and out of Boston several times this fall and winter. I will surely call on you or give you a ring while I am there. Unfortunately my vacation will be over before the twenty-fifth reunion. I remember the fifteenth very well. Perhaps by the time the thirtieth draws around, I will be able to attend again. Please give my chin-chins to old classmate friends. . . ." Thank you, Harvey, for those kind words about my job as Secretary. I do hope you can get to the twenty-fifth, as we would all be fascinated with the many interesting stories you could undoubtedly tell about the past few years in Japan.

When the boys bawl me out for not keeping after them, it is gratifying to know of their loyalty, such as that of Ercell Teeson, who writes: "As per your request for class dues, I am sending you a check, but believe me if you don't send me notices of when the Boston crowd is to get together, you are going to be off my mailing list forever. I go down to Boston quite frequently and would like to attend some of these dinners that I don't know about. I read about them after in the alumni news but never hear about them beforehand, so please put me on your mailing list so that I can take a peek at some of the other fellows. . . ." — Funny Dave Hughes from the West Coast says: "I think that the inclosed check is probably more interesting than any letter I might write." — Allen Abrams from Rothschild, Wis.: "Inclosed is my check with regards. Sorry I couldn't get to the cocktail party. I am taking my family to Bermuda for a little outing.

Best of luck and regards to all the gang." — Maybe the Class Secretary is a good salesman. At any rate Howard King is rather flattering in saying: "Inclosed is my check. This is to congratulate you on your letter. It is darned subtle. My sales resistance disappeared. The Silas Mason Company, for whom I work, has a job in Everett, Mass., so I may be in your city one of these days." — From Corning, N.Y., good old Otto Hilbert says: "Sorry I cannot be in Boston for the class cocktail party. Please give my regards to the bunch and my inclosed check to the collection."

What kind of a reputation have I got anyway? Max Woythaler in Framingham, Mass., writes: "Inclosed is my check. How much more does it cost to see you?" I don't like that implication! — Chauncey Durkee in New York: "Keep up the good work." — Ken Kahn in Los Angeles says: "Inclosed find check for dues. I enjoy the class notes in *The Review* even though I haven't much to add to them in the way of news." — Orton Camp is on the spot for the reunion when he writes: "I have been a little slow to answer your letter. I shall not be at the cocktail party but I am expecting to show up for our twenty-fifth." — From Joe Livermore: "Sorry my check isn't for \$500 but the extra zeros seem to escape me right now." It was acceptable anyway, Joe. — We can always count on John Dalton in Lawrence, Mass.: "Sorry not to have attended to this matter sooner in appreciation of your continued efforts on behalf of 1915. You are welcome to my check." Thanks, John. We hope to see you soon. — Breezy Louis Zepfler does not seem to have a care in the world when he says: "My wife and I are spending the last week of my vacation at Minot, Mass. Right now we are on our way to see the Red Sox beat the Yanks. (Sez you, Louie!) We are staying over for the cocktail party."

Loring Hall in Detroit pens: "Inclosed is check. Am glad to help. Sorry I couldn't be at the cocktail party but it came at the same time as our annual United-Carr party at Sinclair Weeks's place in the White Mountains. I hope you all had a good time. My son, Chuck, is going to civil engineering camp at East Machias this summer. How I would like to go with him! Those two summers at Gardiner's Lake were high points in my life. I hope to spend a couple of weeks at West Harwich on the Cape in August. Maybe I will bump into some of the boys then." — Francis Hann sounds successful as an attorney in Los Angeles: "Just a line to say 'howdy' and wish you a lot of success in your endeavors. I have been out here for nearly ten years but generally get East each year either to enjoy Florida and its fishing or Cape Cod with its delightful bathing, and so on. Best to our mutual friends. . . ."

Now about that famous memorable and noisy class cocktail party at the Statler on Alumni Day, June 5. Breaking down our reserve and inviting the ladies produced delightful results with a galaxy of class femininity that will establish the

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ladies as a precedent at our future parties. Genial, good-natured Bert Adams put the party over with a bang by performing a few of his mystifying, entertaining tricks. As near as we can figure there were between 60 and 70 present at the party, which made it a rousing success. Those present included the following guests: Robert A. Schmucker, Jr., '39, the son of our own Bob Schmucker, Orville Denison '11, E. A. Varney with Wally Pike, Pearl and Albert Wechsler '21, Mr. and Mrs. Charles M. Davidson of Wellesley, Mr. and Mrs. Alford P. Rudnick and Frances Clarke of Brookline. The party was practically stopped by the presence of Ruth Hamburg, Abe's delightful daughter, and Virginia Thomas, the real class baby but attractive enough to be eligible for much older company. (All of us oldsters gazed at these two youngsters and sighed.) With Virginia came her mother, Barbara Thomas.

Of our own gang the following were there: Louie and Leila Zepfner and his sister Mrs. Alice Franham, Max and Katherine Woythaler, Bert and Helen Adams, George Pirate Red Rooney noisily in person, Herb Swift, Weare and Katherine Howlett, Henry Sheils, Louie Young, Bob Schmucker, Abe and Haya Hamburg, Henry E. Rossell (it was a pleasure to welcome Commander Rossell to his first class party), Marshall Dalton, Chet and Mrs. Runels, Bob Warren, Fred and Mrs. Waters, Gabe and Tess Hilton (Tess always adds to the excitement), Azel Mack, Russell A. Trufant, Charlie and Bee Norton, El and Mrs. Castleman and son Robert '39, Seward and Mrs. Highley, Archie Morrison, Easty Weaver, Larry Landers, Pete Munn, Horatio Lamson, Johnnie and Catherine O'Brien (no party complete without John, but he had to watch his step this time), Harry and Lucile Murphy with Harry's favorite aunt, Rita Tobin, whom several of us remember from last year. The party attracted other Tech men in the hotel, and we were pleased to have Seymour Spitz, Harry Wylde, and Alden Waitt, all from 1914, drop in to see us. It was a real thrill to see these three chaps after an absence of so many years.

A petition asking to have ladies present at future class parties was signed by the ladies and those who came with them. The ladies added so much to the occasion that they may be sure of future invitations. — To the sons of our classmates who have just graduated and who are going out in the world, our best wishes for success.

In New York recently I had a delightful visit with St. Elmo Piza and Jim Tobey. Both are healthy, happy, and enjoying life. Always nice to see these good friends. Saw Willis in Boston but missed Guernsey Palmer — my tough luck, as I should like to have seen him. — What next from our budding and rising political aspirant! I was nearly knocked over with a big, black 60-point headline in the New York *Post* of August 22. "HON. HERBERT D. SWIFT OF NEW LONDON, NEW HAMPSHIRE, WELCOMED AT NEW YORK WORLD'S

FAIR." If it was a gag, Speed, it was a good one! — Bob Schmucker, whom we haven't seen since graduation, must have enjoyed the party, as he writes: "Indeed I am glad to inclose my check for dues. For the first time in my life I attended a reunion of the Class, particularly pleasant at the time of my son's graduation from M.I.T. It was a pleasure to see Hilton, Rooney, and others with whom I had been closely associated in school work after so many years — all amid cries of 'more Scotch' and 'help Azel.'" — Now, if you want to continue to "help Azel," plan to be at our twenty-fifth reunion to make it the biggest and best ever. — AZEL W. MACK, *Secretary*, 40 St. Paul Street, Brookline, Mass.

## 1916

Al Lieber, who is with the War Department as major, Corps of Engineers, Beach Erosion Board, Washington, D.C., gave some interesting bits of news to your Class Secretary in a recent letter. Al is assigned as resident member of the Beach Erosion and Shore Protection Board and finds his work interesting and active. He says that unfortunately most communities worry about their shores in the off season, so he seldom has a chance to use a bathing suit and wishes to assure his classmates that if they are suffering from eroding shore lines on the Atlantic or Pacific oceans, the Great Lakes, or the bays and estuaries connected therewith, now that he has the matter well in hand he can guarantee that eventually the situation will be much worse. Al had a letter from Jap Carr in which Jap said that while he frequently went through Washington, it was generally late at night and hence he had not looked Al up. Al warned that if Jap were implying that that is no time to dig him out of the War Department, he would have to discontinue his free advertising of Jap's fruitcake, as the middle of the night is when Al feels he is at his best. Jap's company recently opened a branch in Greenwood, S.C.

Best wishes are extended to Ed Barry on his new venture as consulting engineer. Ed has opened an office at 80 Federal Street, Boston, Mass., for the practice of a specialized service for industrial steam plants. — Shatswell Ober was one of the several staff members who represented the Institute at the fourteenth annual inspection of the laboratories of the National Advisory Committee for Aeronautics at Langley Field.

It has been a long time since the Class has had any news about Frank Hastie, and your Secretary is pleased to quote from a letter recently received from Frank, who is with the military construction unit, Corps of Engineers, United States Army, located at 641 Washington Street, New York City; telephone CANal 6-2100, extension 31. Frank writes: "Unfortunately business affairs would not permit my attending the last reunion, and I am almost entirely out of touch with the Class. However, I can tell you what I've been doing the last few years. I resigned as a captain in the corps of engineers in

1928 to go into business with my father. We would not recognize the depression for several years and by that time prosperity no longer recognized us. Finally, in 1937 we closed the business up. Since then I have been on construction work with the engineer department in the Providence district, with the quartermaster general's department, and at present am engaged in the preparation of standard-type plans for structures and establishments in the theater of operations. The plans, when completed, will form part of the file of the chief of engineers. It is very interesting work with congenial associates.

"My family at present is in Vermont. I did not get around to learning to ski this past winter, but I did give my ribs an awful beating on a sled and got in some skating. Lately I have been house hunting on Staten Island and anticipate getting settled there shortly in a house large enough to accommodate the five young Hasties, the household pets, a ping-pong table, and a poker room. The grounds back right up on a freshwater lake where the children can swim in the summer and skate in the winter, so that needless to say the vote was unanimous." Frank also inquired as to the whereabouts of Ed Clarkson, whom he had not seen since Ed appeared at his wedding at Virginia Beach in the summer of 1920.

Notice has been received of the death on June 8 of Irene Gifford Steese, La Jolla, Calif., telephone supervisor, signal corps, United States Army, American Expeditionary Force, France; wife of George M. Steese, captain, United States Army, retired; mother of Anne Gifford Steese, aged nine.

It is a pleasure to report that two of our classmates, who were on the sick list for some time, have now recovered: Ralph Fletcher and George Repetti. Ralph had a rather serious illness last year but is now on his feet again. George Repetti spent several weeks in the hospital, after which he went to Honolulu for a rest and then to Santa Barbara, Calif., where he expected to remain until September 1, then planned to return to Colorado Springs and business.

Herb Gfroerer writes that he is enjoying the best of health and is spending quite a little time right now in Stamford, Conn. Herb saw Doug Robertson, II, in Taunton early in June and says that Doug is the same fine fellow he always was, with his rare sense of humor. Doug was just finishing a new summer home to replace the one lost in the hurricane last fall.

In some manner a letter received from Bill Fleming last spring got tucked away and its newsy contents were not passed on. Bill, who is with the Goodyear Tire and Rubber Company, was transferred from their Los Angeles office to their main plant at Akron, Ohio, where he was promoted to manager of their general merchandise control department, reporting directly to the executive vice-president and the executive operating committee. In his new position he will have



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charge of the distribution of all products manufactured by Goodyear and purchased for resale in the United States. Under his direct supervision will come all traffic, all merchandise distribution, and all shipping and warehousing. Bill says he will have considerable traveling to do and will no doubt come in contact with a great many more Technology men than he has in the past. If any classmates happen to be in the vicinity of Akron on business or pleasure, Bill would be delighted to have them look him up. Bill has a boy, aged nineteen, who is a junior at the University of Redlands, Redlands, Calif., and a daughter, aged seventeen, who planned to enter college this fall.

It is your Class Secretary's sad duty to inform you of the death of our classmate, Donald R. Husted. The following information was taken from the New York Times notice and from information forwarded by Harold Dodge: Donald R. Husted, communications engineer for the Western Electric Company, who was in charge of the installation of radio equipment in the airplane in which Miss Amelia Earhart and her navigator, Fred Noonan, were lost in the Pacific in 1937, died of heart disease in the North Country Community Hospital, Glen Cove, Long Island, on August 18.

Well-known flyers such as Howard Hughes, Al Williams, Colonel Hutchinson, and the late Amelia Earhart and Frank Hawks had their radio installations engineered by Mr. Husted. He was one of the experts consulted when the Earhart plane was lost, and said that the 50-watt transmitter and its power supply and antennae were so arranged that if the plane was forced down at sea, signals could still be sent.

Born in Newburgh, N.Y., May 21, 1894, he taught at the Institute for a short time after graduation, and also at New York University for a short period. From 1920 to 1927 he was with the L. A. Thompson Company, New York City, engaged in structural and electrical design and development work. From 1929 to 1930 he worked for the General Development Company at Hartford, Conn., where his field of work was aeronautical design and air-transport investigation. In March, 1931, he joined the Western Electric Company and since December of that year was associated with the commercial engineering department as aeronautical radio specialist. His work brought him in intimate contact with the early problems of installing radio telephone equipment in various types of planes. Such problems as antennae, power supply, and bonding and shielding of ignition systems had to be overcome before reliable radio communication could be assured. Mr. Husted contributed to the solving of these problems. His early background of experience with aircraft and radio made him peculiarly fitted for the work. He made his home in Glen Head, Long Island, N.Y. He is survived by his widow, Mrs. Mildred Campbell Husted; a daughter, Mary Jane; and a son, Richard.

Jack Freeman of Middlebury, Conn., speaks of Donald in these words: "An

able student and greatly admired by those associated with him. His quiet, friendly personality has carried down through the twenty-three years since graduation, so that I feel that it was but a few days ago I last saw him. He was one of those classmates you always hoped and looked forward to seeing again frequently and knew would succeed in whatever field he followed." — JAMES A. BURBANK, *Secretary*, The Travelers Insurance Company, Hartford, Conn. STEVEN R. BERKE, *Associate Secretary*, Coleman Brothers Corporation, 245 State Street, Boston, Mass.

## 1917

The open season on class notes is on us again after the summer lull. Your Secretaries assume again their official mantles and cast about for something to write. As is usual at this season there is a dearth of material and we bespeak again your co-operation. Do let us have at least a brief note for use in future issues.

E. P. Brooks was elected vice-president of Sears, Roebuck and Company at the April meeting of the board of directors. We understand that Penn is now in charge of all of Sears's manufacturing activities. — Lewis W. Douglas, who since 1938 has been president of McGill University in Montreal, will become president of the Mutual Life Insurance Company of New York on January 1. He will, however, continue to serve McGill as a governor. — Forrest M. Hatch recently married Miss Gladys Beulah Gamage of Wollaston, Mass. They are now at home at 253 Main Street, Nashua, N.H.

Harold A. Knapp is manager and treasurer of the Mutual Fire Inspection Bureau of New England, located at Salem, Mass. He is married and lives at 73 High Road, Newbury. — Arthur K. Johnson is a chemist in the Neidich process division of Underwood Elliott Fisher Company, Burlington, N.J. — Chester E. Ames is the dial equipment engineer for the New England Telephone and Telegraph Company. — Your Secretary was very much engaged with the September meeting of the American Chemical Society, held in Boston, and afterward he went to the Middle West. No doubt a more complete account of his meetings with members of the Class will be forthcoming.

Ken Lane called on your Assistant Secretary one warm morning during the summer and we can report, therefore, that he is safely home from his latest journey to Europe.

Irving B. McDaniel is now on duty at the Washington Navy Yard. He writes that he has just returned from a summer motor trip to the Tetons, Yellowstone Park, the Sawtooth Mountains, and Salmon River country in Idaho. In late August, Mac attended the biennial convention of the Delta Tau Delta Fraternity at Estes Park in his capacity as president of the southern division of the fraternity. — RAYMOND STEVENS, *Secretary*, Arthur D. Little, Inc., 30 Charles River Road, Cambridge, Mass. PHILIP E. HULBURD, *Assistant Secretary*, Phillips Exeter Academy, Exeter, N.H.

## 1919

The Class held its twenty-year reunion on June 2, 3, and 4 at the Belmont Country Club near Boston. The first arrival at the reunion was Timothy E. Shea who made his appearance even before the committee assembled at noon Friday. The ball really started rolling on Friday evening, and those fortunate enough to be present had an excellent opportunity to reminisce over old times and to plan for the future of the Class. On Saturday, arrivals continued until the banquet in the evening. During the day Timothy Shea and Bob Hackett won the honors at golf, while Joe Newell and Art Griffin were outstanding in the ball game. The high spot of the week end was the banquet, followed by informal discussion lasting into the wee small hours of the night. We learned what everyone else was doing and were fortunate in having some interesting discussion by experts of engineering and business.

The business part of the meeting resulted in the election of Gene Smoley as permanent secretary of the Class and the appointment of George McCreery, Will Langille, Max Untersee, and Art Kenison as assistant secretaries. There was considerable discussion regarding the next reunion, and President Way appointed Will Langille as chairman and Bill Banks as vice-chairman of our twenty-five year reunion committee.

Sunday morning a number of those who had stayed over were escorted through the new Briggs Field House by George McCreery, who, as contractor, was responsible for the erection of this magnificent building. Some snapshots were taken of the last eight stragglers early Sunday afternoon; classmates who are interested in obtaining copies may do so by writing the Secretary. It was the unanimous feeling of those who attended this reunion that everyone had a wonderful time, valued the opportunity of renewing old friendships, and enriched their lives by having been there. The only regrets were that more were not able to attend. Everyone hopes that the next reunion will see many additional faces. Bill Banks was chairman of the committee which handled this reunion, and the Class appreciates very much the excellent way in which it was done.

Some of the news accumulated during the reunion follows: Fred. P. Baker is with the Connecticut Power Company at Unionville, Conn. His address is 381 South Main Street, West Hartford, Conn. — Arthur H. Blake claims to be doing nothing with his place of business on Stuart Street, and they tell me that one would probably find something relating to Diesel engines in the immediate vicinity. — Ray H. Bartlett is industrial engineer, active in the rubber industry, with an address at 98 Thornton Road, Waltham, Mass. — Edmond J. Flynn is with the production department of the New Jersey Zinc Company, Palmerton, Pa. — Maurice E. Goodridge is with an electrical company; address: 14 Ober Street, Beverly, Mass. — Arthur E. Grif-

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fin is in the construction business at 238 Main Street, Cambridge, Mass. Among his other accomplishments we found that he was president of the Boston Chess Club, but he refuses to play chess with any challenger.

Bob Hackett is in the wool business and frowns on anyone wearing anything made of cotton or silk. — Jim Holt is associate professor of mechanical engineering at Technology and specializes in air conditioning and steam power-plant work. — Art Kenison is in the life insurance game, acting as a counsel. His address is 97 Milk Street, Boston. — Wirt Kimball is with the Cambridge Gas Light Company as an industrial engineer, and his address is 78 Chester Road, Belmont, Mass. — Bill Langille is manager of the Diehl Manufacturing Company, subsidiary of Singer Sewing Machine Company, which builds electrical equipment for Singer sewing machines, vacuum cleaners, flatirons, and so on. His address is Elizabeth, N.J. — Marshall B. Lee is in the carton business, particularly in the special design sales end. His address is Park Lane, East Walpole, Mass. — Warren Maynard was present Saturday afternoon but unfortunately could not attend the dinner. — Joe Newell is a professor on airplane structures at Technology. His address is P.O. Box 123, Lincoln, Mass.

Al Richards is in sales for Dewey and Almy Chemical Company, Cambridge, Mass. They put out such products as Latex and so on. His address is 86 Van Ness Road, Belmont, Mass. — Arklay S. Richards, who incidentally just passed by my office as I am dictating these notes, is in the manufacture of pyrometer supplies, thermocouples, and so on, with home address of 26 Parker Street, Newton Center, Mass. — Karl F. Rodgers is with the Bell Telephone Laboratories, 463 West Street, New York City, on the design of capacitors and condensers. — Ted Shedlovsky is with the Rockefeller Institute in New York City, studying the causes of death in the capacity of physical chemist. — Bill Sheeline is in the investment and securities business in Boston and is active in an aeronautic company in the development of a new type of airplane engine. — Gene Smoley is in the selling end of the oil refinery, engineering, and construction business with the Lummus Company, Graybar Building, New York City. — Carl Oscar Svenson is an associate professor in mechanical engineering at Technology. — Max Untersee is working on slum-clearance projects and is located at 123 Wolcott Road, Chestnut Hill, Mass. — Don Way is chief engineer of the Diehl Manufacturing Company at Elizabeth, N.J., but has moved his home to 226 Wychwood Road, Westfield, N.J. — Eaton Webber is with the Boston Gear Works. — George H. Wiswall is in the shoe business with address at 159 Weston Avenue, Braintree, Mass.

Lester Wolfe is with the Radio Navigation Instrument Company working on equipment for airplanes. He is located at R.F.D. Number 1, Springdale, Conn. — Ben Bristol is with the Foxboro Company, Foxboro, Mass., and sailed for

England the Wednesday before the reunion. — Cutter P. Davis is general manager for Winfield H. Smith Company, Springville, N.Y. — Os O'Connor is in the construction business in New England but because of illness was not able to attend the reunion. — Gene Mirabelli is an associate professor of civil engineering at Technology. — Stockbarger is an associate professor of physics at the Institute.

Regrets were received from Edward G. Moody, 9 Pine Road, Lynn, Mass.; Oscar A. de Lima, 55 River Street, Stamford, Conn.; Richard S. Holmgren, 31 Ridge Road, Concord, N.H.; Anthony W. Contieri, 17 Holworthy Place, Cambridge, Mass.; Freddy Given, Paterson, N.J.; and Raymond G. Lafean, 200 Frick Building, Pittsburgh, Pa.

Still in the land of the living: Ernest F. Perkins, Melrose, Mass.; Leighton Smith, 143 Colon Street, Beverly, Mass.; Joe Kaufmann, 3634 Everett Street, N.W., Washington, D.C.; Edgar R. Smith, United States Bureau of Standards, Washington, D.C.; Paul F. Swasey, Virginia Electric and Power Company, Norfolk, Va.; Frank J. Coyne, Sterling Michigan Corporation, Chelsea, Mich.; Merritt P. Smith, Thornapple Street, Chevy Chase, Md.; Isidor Slotnik and George Michelson, 91 Newbury Street, Boston; Louis Wolfe, 7 Naples Road, Brookline, Mass.; Frank P. Reynolds, 68 Rhoades Avenue, East Walpole, Mass.

During the summer other addresses came in: W. Kenneth Pike, from Shawnee, Okla., to 2304 Bullington Street, Wichita Falls, Texas; Lincoln Hoffman-Pinther, from Los Angeles to 2 Oak Knoll Terrace, Pasadena, Calif.; Victor N. Samoyloff, from New York City to care of Kravetz, R.F.D. Number 6, Bridgton, N.J.; Lieutenant Commander Henry E. Wilson, from Pearl Harbor, Hawaii, to Norfolk Navy Yard, Portsmouth, Va.; Daniel C. Hall, from Newport, Del., to 116 Edgewood Road, Towson Estates, Towson, Md.; Robert R. Litehiser, from Albany, N.Y., to 2356 Oxford Road, Columbus, Ohio; Holley S. Winkfield, to 24 Calvin Road, Jamaica Plain, Mass.

I noticed in the September issue of the *Journal* of the Society of Automotive Engineers an article entitled, "The Analysis of Leading-Edge Wing Beams." The following write-up about the author will be of interest to the Class: "Joseph S. Newell has specialized in the structural side of airplane design since entering the aviation field in 1922. Among his contributions to the art of stress analysis are the 'Precise Method' for the analysis of beam-columns, some of the requirements in the earlier editions of the Army Handbook for Airplane Designers, and some of the present procedures for the analysis and design of 'stressed-skin' aircraft structures. While consultant to the Department of Commerce in 1927 he adapted the Army's stress analysis procedure to the needs of the then rapidly expanding commercial aircraft industry, and prepared the requirements for airplane air-worthiness issued in the fall of that year. Since 1927 he has been at the Massachusetts In-

stitute of Technology where he is now professor of aeronautical engineering. The book, 'Airplane Structures,' written by him in collaboration with Prof. A. S. Niles, has made him known to aeronautical engineers in this country and abroad. He holds B.S. degrees in Civil Engineering from M.I.T. and Harvard."

Some more classmates chose the summer to pass on news of having moved: Herbert W. Barrett, XI and XV, 25 Avalon Road, Waban, Mass.; Lawrence B. Cahill, IV, Southland Hotel, 15th and Alton Road, Miami Beach, Fla.; Grant E. Gay, X, Premium Commercial Corporation, 99 West Main Street, New Britain, Conn.; Walter M. Howlett, XV, Crossways-Columbia Road, Dobbs Ferry, N.Y.; Paul G. Jenney, I, 42 Lawson Road, Egypt, Mass.; Ervin M. Kenison, XV, 18 Sawyer Avenue, East Orange, N.J.; Mrs. Raymond Newcomb, VII, 28 Hillside Road, Newton Highlands, Mass.; and Francis O. Wyse, 1961 North Summit Avenue, Milwaukee, Wis.

Timothy E. Shea, VI, has a new address: Electrical Research Products, Inc., 195 Broadway, New York. The following information was released for publication in the morning papers, Monday, July 31: "At a special meeting of the board of directors of Electrical Research Products, Inc., held today (Friday, July 28) T. E. Shea was elected vice-president, effective August 7, succeeding H. G. Knox [10], who resigned July 15 on the advice of his physician. Mr. Shea, formerly of Bell Telephone Laboratories, becomes director of engineering and will have charge of all technical activities for the company in both New York and Hollywood. In appointing Mr. Shea to head E.R.P.I.'s engineering function, T. K. Stevenson, President, today said: 'The long-range development program adopted by this organization demands the closest possible working relationship with Bell Telephone Laboratories. Mr. Shea brings to his new responsibilities a strength of technical background which is unique in the field. E.R.P.I. has drawn most of its engineers from Bell Telephone Laboratories, and Mr. Shea's appointment is a fresh draft on that fountain of technical knowledge.'

"T. E. Shea was graduated in electrical engineering from M.I.T. in 1918. After two years there as instructor he entered the Western Electric Company and shortly transferred to the engineering department, which later became Bell Telephone Laboratories. Here he first had charge of the development of electric wave filters and equalizers. Carrier telephony, transatlantic radio, and television employ networks which were developed under his supervision. His widely read book 'Transmission Networks and Wave Filters' is recognized in technical circles as the ultimate reference work on this subject. In 1929 Mr. Shea was placed in charge of acoustical, optical, and electrical-circuit development in connection with sound-picture work. As the sound-picture industry grew from its early conception to a world-wide industry, a substantial part of its advancement was



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brought about under his immediate direction. Among the problems of this period to whose solution Mr. Shea contributed may be noted the light valve, flutter control, noise reduction, and wide-range recording. Mr. Shea's work was by no means confined to the laboratory. In the course of his frequent visits to the studios and theaters he became widely known to the technical staffs of all major producers and exhibitors.

"Two years ago, Mr. Shea was designated to organize in Bell Telephone Laboratories a new line of long-term development involving telephone switching apparatus. His work in these problems has been principally with mechanical apparatus. He is a fellow of the Acoustical Society, a fellow and past treasurer of the Society of Motion Picture Engineers, and an associate of the American Institute of Electrical Engineers. In addition to his book, Mr. Shea is the author of a number of technical papers. . . ."

The Class Secretary urgently requests news for the coming issues of *The Review*. — EUGENE R. SMOLBY, *Secretary*, 2 Fairmount Avenue, Hastings-on-Hudson, N.Y. GEORGE W. MCCREERY, *Assistant Secretary*, 275 Cypress Street, Newton Center, Mass.

## 1920

First let me give you the most important class news in five years, in fact, the most important news in twenty years come next June — news about '20's twentieth reunion. You will be pleased to know that Pete Lavedan has accepted the general chairmanship of the reunion committee, and that the committee has already been decidedly on the job. Reservations have been made at the Sheldon House, Pine Orchard, Conn., for Friday, May 31, and the following Saturday and Sunday, directly ahead of Alumni Day, which will be Monday, June 3. Those of you who attended the fifth reunion at the Sheldon House will not need to be told its many good features in addition to the fact that it is handy both to New York and New England. The Sheldon House is on record as follows: "The Class of 1920 may rest assured that everything possible will be done to make their twentieth reunion most successful and one that will be long remembered." Food and service will be first class and total cost exceedingly moderate. We will have exclusive use of the hotel. Pete Lavedan may be reached at 52 Vanderbilt Avenue, New York City, where he is vice-president of the Liquid Carbonic Corporation.

The Class was well represented at Alumni Day last June. Some of those whom your Secretary caught a glimpse of were Alfred Glassett of New York, Foster Doane, Fred Bowditch, Bud Cofren, Norrie Abbott, John Nash, Ed Ryer, Buzz Burroughs, Elbridge Wason, Jim Gibson, Buck Clark, Heinie Haskell, Scott Carpenter, Al Burke, and, of course, the other Bugbee twin.

Austin Higgins is deputy commissioner of welfare for Erie County, N.Y., including the city of Buffalo. He is in charge of business administration for the depart-

ment which handles a budget of sixteen million dollars and serves 125,000 welfare recipients. Formerly Austin was in the retail business as comptroller of L. L. Berger, Inc., Buffalo specialty store. — Henry Erickson is with the Allis-Chalmers Manufacturing Company and was recently transferred to the El Paso office where he is sales manager. — Donald Ferris has left Detroit and is now in Tarrytown, N.Y. — Leland Gilliatt's address is now 104 Buckingham Street, Springfield, Mass. — Fraser Moffat is with United States Industrial Chemicals, Inc., 60 East 42d Street, New York. — K. B. White was still in Paris, France, the last we knew; his address is 34 rue de Lille. — Ted Bossert may be reached at 1524 Shady Avenue, Pittsburgh. Arthur Dopmeyer is with the United States Public Health Service in San Francisco. — Archie Cochran is located in Louisville, Ky., at the Cochran Foil Company. — Jim Downey's new address is 20 North Broadway, White Plains, N.Y. — Perk Bugbee has recently been promoted to general manager of the National Fire Protection Association with headquarters in the Public Service Building, Boston. — HAROLD BUGBEE, *Secretary*, 7 Dartmouth Street, Winchester, Mass.

## 1921

Autumn, with shining morning faces off to school, is always a pleasant reminder that we resume monthly get-togethers in these columns for the next three-quarters of a year. On receipt of the first notice from *The Review*, our joy is practically complete, despite (a) the proprietary view of the genus secretary, (b) the awful realization that only the Editors enjoyed the nine last effusions, and the readers (plural, thank goodness) merely rejoiced in the co-operative efforts, (c) a command for personal delivery of copy, and (d) the uncertainty of subsequent communications scheduled only "as time goes on." But even the mad antics of Mars, so reminiscent of our own days at Technology, cannot detract from zestful chronicling of news for which we are indebted to the co-operative efforts of those same readers and to the *Review* Editors, who really are most helpful and indulgent even in the face of wholly unfair diatribes such as the foregoing. [The "first notice from *The Review*" to which Mr. Clarke refers is reprinted here so that you may relish his retaliation: "To our Class and Club Secretaries: Volume 41 closed in July, and now Volume 42 is about to open. We have enjoyed your faithful contributions during the past year, and we know that our readers have rejoiced in your co-operation. Summer vacation encounters must have added to the news you picked up at reunion and we hope your postvacation enthusiasm matches ours. Bring on your notes! Copy for the November issue is due in this office on September 25, a Monday. You will receive our customary notices for subsequent issues as time goes on."]

For those who were unable to share the fun of Alumni Day last June, be it recorded here that our own Warrie Norton,

XV, chairman of the General Staff of Alumni Day and vice-admiral in command of the S.S. *M.I.T.*, deserves sincere thanks and high praise for an altogether enjoyable day. Larcom Randall, VI, was on Warrie's publicity and promotion committee. Appropriately, twenty-one of the Class were registered as participants in the scheduled events. The first of the gang we ran into was Harold H. Lockey, XV, of Prospect Street, Great Barrington, Mass., who was attending Dr. Compton's Dinner to Class and Club Secretaries and Honorary Secretaries. Harold is the Institute's honorary secretary in his home town. Next was Richard McKay, XV, strolling into Walker Memorial for Professor Schell's ('12) anniversary celebration of Course XV. Dick lives in Newton. Besides these, the following were seen at various events of the day or heard in liquid tones during the nautical banquet at the Statler to climax the annual observance with "A Stein on the Table": Ellie Adams, V; Johnny Barriger, XV; Mich Bawden, XV; Cac Clarke, VI; Ed Delaney, I; Ed Dubé, I; Dan Harvey, III; Vic Homerberg, III and X; Dug Jackson, VI-A; Mel Jenney, VI; Chick Kurth, VI; Frank Lord, XV; Bill Ready, I; Ace Rood, X; Slide Rule, XV; Ken Skardon, I; Lyall Stuart, IX-B; and Frank Whelan, I.

Publicized by *The Review* in connection with the Alumni-Day conference theme of "The Technology of National Defense" was an article by S. Paul Johnston, II, on "Our Air Defenses: The Navy" which appeared in *Aviation* for November, 1938. Paul is editor of *Aviation* and was recently in the news for having presented to United Air Lines his magazine's annual maintenance award for 1939 in "recognition of outstanding contribution to the field of maintenance and equipment in air transportation." — Publicized in the pamphlet "A Technology Bookshelf," presented to Alumni by the M.I.T. Library, were three books by 1921 men: "Theory of Statically Indeterminate Structures" by Walter Fife, I, in collaboration with John Wilbur '26; "Principles of Metallography" by Vic Homerberg, X and III, in collaboration with Robert S. Williams '02; and "Electric Circuits: Theory and Applications," Volume 2, "Power System Stability" by Gus Dahl, VI. All three books are published by McGraw-Hill.

While we're on the subject of writing and publicity, word has gotten around that David O. Woodbury, VI-A, has published another book, due no doubt to some few hints we dropped in several columns last year. Those who remember the thorough and interesting presentation of Dave's earlier book, "Communication," will hasten to obtain the new volume entitled "The Glass Giant of Palomar" from the publisher, Dodd, Mead and Company.

The June 17 issue of the *Saturday Evening Post* published Dave's article "New Heavens for Old," which was well received by both the general public and those who have particular interest in the greatest precision-engineering feat of our

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times — the story of the huge new telescope being built in California, a project conceived and promoted and now chronicled by Tech men. On September 10 *This Week* magazine, which appears with many Sunday newspapers throughout the country, featured another Woodbury article, "Man Bites Glass," which highlights an extruck-driver's task of accurately polishing the surface of a 200-inch disk of glass to within two-millionths of an inch of a true paraboloid.

Writing from Ogunquit, Maine, where he is associated with the famous summer theater, Dave says in part: "My book, 'The Glass Giant of Palomar,' will be published September 19, and present indications are that it will be a comfortable success. It has been made the choice of the Scientific Book Club for that month and will receive special mention in the Book of the Month Club *News*. The book is the full-blooded history of the 200-inch telescope, beginning with its early antecedents, the Yerkes and Mount Wilson observatories, and progressing in a sort of latter-day Jules Verne manner down to the last nuts and bolts now being assembled on the mountain in the southern wilderness of California. I have omitted nothing. There are chapters on the unfortunate affair of the quartz disks, innumerable personal stories and anecdotes about George E. Hale '90 and the score of astronomers who helped him; statements by Eddington, Shapley, and others, and a chapter on the public in their relationship to this astronomical giant through which, believe it or not, even the scientists never hope to look.

"I am gathering momentum for a series of illustrated lectures on the telescope and have already addressed the Amateur Telescope Makers convention at Stella-fane, Vt., and also their Portland chapter. Am expecting to cover schools and colleges during fall and winter and am open to propositions along this line. Have been filling in the time planning my next book under the working title 'The Mad Colorado,' which I am to do for Dodd, Mead and Company. I expect to winter in California, collecting the lore of Imperial Valley and the surrounding hundred-thousand square miles. The book is to be a novel and will in its first two thirds furnish the complete background story of the Mad River, to be capped in the last third by a running-fire, truth-more-than-facts account of Boulder Dam. There are a few crannies left in my schedule, and these I am plugging with a scenario in hopes Hollywood will buy, thus introducing the films to astronomy for the first time and to a veracious picture of scientists." As we jot these words, the book sections of the New York papers have announced Dave's book and we all hope it will top the list of best sellers. More power to you, Dave, in those efforts to make the movies take engineers out of the alchemists' background!

Wandering through the New York World's Fair we noticed gigantic presses of Howard MacMillin's Hydraulic Press Manufacturing Company of Mount Gil-ead, Ohio, in the Bakelite, du Pont, and

other exhibits. It is unofficially reported that Howard's machines pressed the Tylon and Perisphere in one operation. The press at Bakelite was under the excellent care and guidance of young Dan Phillips '38 of the Bakelite Company, whose father is one of the mainstays of the M.I.T. Club of Northern New Jersey.

Will anyone knowing the present addresses of the following kindly send them to the Register of Former Students at Technology: Elmer W. Davis, II, formerly of 143 Allen Place, Hartford, Conn.; Clifton B. Morse, XV, formerly of 11 Chaske Avenue, Auburndale, Mass.

Among the many whose new addresses were received during the summer are Harry J. Abrams, XV, 1307 Randolph Street, N.W., Washington, D.C.; George H. Atkinson, X, 455 Main Street, Stoneham, Mass.; William F. Atwood, X, Post Office Box 142, Chelmsford, Mass.; J. Ernest D. Clarkson, II, 822 Church Lane, Lansdowne, Pa.; Lawrence W. Conant, XV, 3063 Ordway Street, N.W., Washington, D.C.; Gustav C. Dahl, VI, Jackson and Moreland, 31 St. James Avenue, Boston; Thomas B. Davis, XV, 1766 Forrest Avenue, Memphis, Tenn.; Captain Paul L. Deylitz, Ordnance Department, Rock Island Arsenal, Ill.; Roderick K. Eskew, X, 120 Chatillon Road, Rome, Ga.; Lieutenant Colonel Thomas D. Finley, I, General Staff Corps, Office of Chief of Staff G2, Washington, D.C.; Kenneth N. Goward, XV, 202 Parkview Avenue, Lowell, Mass.; Newell A. Grover, I, State of California, Division of Highways, District IV, 211 State Building, San Francisco, Calif.; Herbert A. Kaufmann, X, 811 Forest Avenue, Wilmette, Ill.; Joseph M. Lurie, X, 12 Libbey Avenue, Lewiston, Maine; Robert F. Miller, XV, Route 3, Box 322, Station F, Milwaukee, Wis.

Other changes in listing have been received from Major Kenneth M. Moore, I, Custom House Building, Procurement District, San Francisco, Calif.; Lewis W. Moss, XV, 147 Hampton Place, Springfield, Ohio; Max B. Pearlstein, I, 48 Clarkwood Street, Dorchester, Mass.; Howard L. Ross, XV, 25 East 83d Street, New York, N.Y.; Edward D. Shea, VI, 33 Capen Street, Medford, Mass.; Michel P. Sinelnikoff, II, Orion Booksellers Ltd., 9 Bloomsbury Street, London W.C.1, England; Harry R. Swanson, X, 2 Westchester Avenue, White Plains, N.Y.; Walter R. Vitalini, II, 51 Fruit Street, Milford, Mass.; Jack H. Waggoner, V, 214 Rugg Avenue, Newark, Ohio; J. Van H. Whipple, II, 79 Jane Street, New York, N.Y.; Harry M. Witherow, VI-A, 401 Atlantic Avenue, Clifton, Mass.; Albion R. Wood, VI-A, 52 Martin Road, Wellesley, Mass.; William H. Young, Jr., II, 160 Market Street, Paterson, N.J.

Whatever your Thanksgiving date, make it all year 'round for your Secretaries by mailing your news to us early and often. — RAYMOND A. ST. LAURENT, Secretary, Rogers Paper Manufacturing Company, Manchester, Conn. CAROLE A. CLARKE, Assistant Secretary, International Telephone Development Company, Inc., 137 Varick Street, New York, N.Y.

## 1922

It is unfortunate that news of the big doings around Alumni Day cannot appear in the class notes until November. Perhaps some of the other Secretaries will second the idea of a special supplement that can be included in the July Review even though it is not prepared before the middle of June. Alumni Day is becoming more and more popular and full of splendid fellowship, particularly for those of us who have little opportunity in our daily lives to see and visit our old classmates. Next to the five-year reunion Alumni Day offers the most rousing fellowship as more and more of the good old gang are finding out. In Cambridge on June 4 and 5 over thirty classmates appeared at one or another of the functions. The Alumni Dinner on Monday night was a rousing affair, and only those who have attended the last couple of Alumni banquets realized what a far cry it is from the staid banquets of the past to the dinners of the present. There was standing room only this year, and next year the Class of '22 will have to take early and strenuous action to insure its proper place in the banquet hall.

The following familiar faces were seen around the Institute and at the banquet: Harold H. Berry, Fred Blackall, Jr., Bob Brown, Don Carpenter, Yard Chittick, King Crofton, Larry Davis, Earl Eacker, Minot Edwards, Ed Fales, Warren Ferguson, Whit Ferguson, John Goodnow, Clayton D. Grover, Jesse Jones, Jr., Sterling Kelley, Harris B. McIntyre, George Marvin, Ted Miller, Bill Mueser, Paul Phillips, Bill Pinkham, George Potter, Lloyd Raymond, Ray Rundlett, Bill Russell, Al Sargent, Dale Spoor, John Teeter, Tommy Thomson, Charles Thomas-Stahle, Bob Tonon, Frank Westcott, and, in order to make the group complete and in proper balance, we announce Marjorie Pierce. Others may have been present but unseen by your humble Secretary; if so, they should announce the fact.

Last spring we had an informal class luncheon in New York under the guidance of Frank Kurtz and Ray Rundlett. This was reported in the last Review. It was decided to hold the first informal Class of 1922 dinner in New York at the Technology Club in May. It was finally necessary to set June 8 as the date but with no intention of stealing the show from Alumni Day in Cambridge. Forty-two were present, including Herb Ham from Springfield, Tom Gill from Trenton, N.J., and the long-distance champions Yard Chittick and Bob Tonon from Cambridge, who came down strictly for the occasion. No effort was made to inject any formality, any speeches, or any collections. As a result, we have yet to hear of anyone who did not thoroughly enjoy himself and does not want another class banquet soon. Frank Kurtz as master of ceremonies asked everyone at the table, while they were still able, to tell in one sentence what they had been doing. Eric Hodgins, who could have kept us regaled with anecdotes for hours, chose to keep



so recently become productive. To the mining industry in Quebec, he is perhaps best known for the work he performed with J. W. Ambrose in the Cadillac-Malartic area, a striking example of the value to prospecting of competent geological guidance. Dr. Gunning is a member of the Institute [Canadian Institute of Mining and Metallurgy], which, in 1937, conferred upon him the Barlow Memorial Prize. He is also a fellow of the Royal Society of Canada, and a member of the Society of Economic Geologists. We wish him, and predict for him, continued success in his new environment. We congratulate the University which he will henceforth serve. At the same time, we cannot but deem it unfortunate that the Survey has lost a man of his calibre and experience." — J. RHYNE KILLIAN, JR., *General Secretary*, Room 3-208, M.I.T., Cambridge, Mass.

## 1927

The following men of the Class attended the M.I.T. Alumni Day on June 5: Dwight C. Arnold, Alf K. Berle, Edward Chase, Elwood A. Church, Harold E. Edgerton, Lawrence B. Grew, Joseph W. Hammond, Raymond F. Hibbert, Ernest C. Hinck, Jr., Donald F. Horton, Hector A. Moineau, Isaac W. Stephenson, John A. Swift, and George R. Taminosian. The interest and camaraderie at the luncheon and dinner made up for the small company. There is great pleasure in seeing again one's old comrades. More of the Class should make an effort to attend these yearly meetings to contribute to their own enjoyment and interests as well as increase that of all of us who do attend. There has been little change in either the way of life or occupation of this group. Dike Arnold is manufacturing aspirators and similar equipment in Boston; Berle is in the development division of the United Shoe Machinery Corporation; Church is an engineer for the Boston Edison Company; Edgerton is still at M.I.T.; Grew is with the Southern New England Telephone Company; Hammond is with Jackson and Moreland; Hibbert is with Johns-Manville; Moineau remains as tin-plate crown prince of Marlboro; Stephenson is in the accounting division of Pratt and Whitney Aircraft, now known as United Aircraft Corporation; and Ernie Hinck is in the real estate and development business in New Jersey.

Larry Grew has perhaps been a little more enterprising than most of us. He has three children and a wife, which in itself is an achievement; but even more, he has become a politico magnifico in North Haven, Conn., where he holds the chairmanship of the school committee and the presidency of the Republican Club. The prevailing tendency for telephone employees to enter politics prompted the inquiry, "Does the Bell Telephone Company operate an employee-politician training school?" The question went unanswered. We understand, however, that from the deep, underground passages far below the street level in every telephone building garbled messages go forth across the land. The first phases of a revolution

may perhaps be taking place and hushed gossip has it that instead of the government's absorbing all business, the Bell Telephone Company will take over the government. There has been word even of conversations between the Bell Telephone and Moscow. Revolutionary and astounding! "How terrible is the revenge of a sheep."

Finding it necessary to leave shortly after the luncheon, your Secretary prevailed once more upon Joe Hammond's good nature to record for posterity the participation of 1927 in Alumni Day, and he has crashed through with the foregoing.

Many months ago Larry Coffin wrote to tell that he is permanently located in South America with the Goodyear people. Larry spent the first three years out of Tech in Akron in the tire-design division, during which time he lived with Tom Knowles and Gordon McNeil. In the latter part of 1930, Goodyear built a new tire factory in Buenos Aires, and Larry was assigned to this new organization to handle technical problems arising from the manufacture of tires, tubes, and heels. At the time of his letter, Larry had been in Buenos Aires for eight years and had really become a home-town booster. By now he has probably assumed his responsibilities at the new Goodyear tire plant in São Paulo, Brazil, where he has been appointed development manager in charge of mechanical and chemical technology. Among the many problems of acclimatization, Larry must now master the Portuguese tongue. Another important event in Larry's career took place in August, 1931, when he married a "young lady who had the courage to come from Akron to Argentina. We have two children, Lawrence, Jr., six years old, and Susan Alice, two years old, both of them born in Argentina."

Larry reported an interesting experience concerning Fred Glantzberg on the occasion of the flight of a group of flying fortresses to South America: "When the flying fortresses came to Buenos Aires a year ago I noticed, in a newspaper giving a list of the pilots, Fred's name. This led to spending a most pleasant and enjoyable day with him and by persistent questioning and much reading between the lines I discovered a most remarkable story of Fred's navigation of one of these ships to Buenos Aires. With little previous navigational experience on long-distance flights and very meager map information consisting principally of the *National Geographic's* South American map — the regular copy sent to all subscribers — Fred had navigated this plane, hitting his fixes in the Caribbean and the Panama Canal right on the nose. At Lima, Peru, his plane was delayed by engine trouble and left several hours after the others. In order to gain time they decided to take the shortest course to Buenos Aires, striking over the Andes and coming down from the north instead of following the Pan American Grace Airways route to Santiago, Chile, and then over the Andes. As Fred approached Buenos Aires a terrible pampero, consist-

ing of wind, darkness, lightning, and rain, came up, blotting out the city of Buenos Aires and his landing field. No navigational aids such as radio beams were available to him, and he had to direct the ship to cruise over the spot where he thought the city was, with his gas running low and his alternative landing field in Montevideo, Uruguay, 100 miles away over the Plata River. They did not have to take this alternative, as a lull in the storm showed them their field below them, and they were able to land in the pouring rain. The navigation on this flight was a wonderful piece of work in which all of us should join in complimenting our classmate Fred Glantzberg."

— RAYMOND F. HIBBERT, *General Secretary*, care of Johns-Manville Corporation, 22 East 40th Street, New York, N.Y.  
DWIGHT C. ARNOLD, *Assistant Secretary*, Arnold-Copeland Company, Inc., 222 Summer Street, Boston, Mass.

## 1929

The big news of the summer was our tenth reunion at Ye Castle Inn, Saybrook, Conn. A grand time was enjoyed by all who attended, and we hope that those who did not show up for the ten-year reunion will turn out for the fifteenth in 1944. The gang started to arrive on Friday, June 2, about noon, and from that time through Sunday the air was filled with cheers, as one after another pulled in from near and far. Bill Aldrich traveled farthest, coming from Billings, Mont., and Ernie Kohler, Jr., was the runner-up from Chicago. The locations from which the rest of the assembly traveled can be found in the following list of those present. Generally the place name is that of the man's home and is not the address of his business: William Aldrich, Billings, Mont.; C. Brigham Allen, Jr., insurance, New Rochelle, N.Y.; Charles B. Bacon, Bacon Brothers, heating, air conditioning, Middletown, Conn.; James S. Bennett, own radio business, Hartford, Conn.; Eric A. Bianchi, Mason-Neilan Regulator Company, East Milton, Mass.; George W. Burgess, Kroger Grocery and Baking Company, Cincinnati, Ohio; George J. Burke, Federal engineer, Springfield, Mass.; Adrian N. Clark, *Good Housekeeping*, Manhasset, N.Y.; J. Russell Clark, Vought-Sikorsky, Stratford, Conn.; Thomas H. Coe, Jr., A. F. Peaslee, Inc., contracting, Hartford, Conn.; Richard J. Coveney, Ethyl Gasoline Corporation, Cambridge, Mass.; George G. Cudhea, Fleetwings, Inc., Bristol, Pa.; Albert L. Eigenbrot, M. W. Kellogg Company, Ridgewood, N.J.; Edward B. Farmer, Kerite Insulated Wire and Cable Company, Seymour, Conn.; Walter H. Gale, M. B. Skinner Company, South Bend, Ind.; Henry L. Giles, State Health Department, Eldwood, Conn.; Earl W. Glen, Goodyear Tire and Rubber Company, Fairlawn, Ohio; Robert W. Gray, Jr., Hartford Empire Company, New Rochelle, N.Y.; Hugh G. Hamilton, Jr., Eclipse Aviation Corporation, Montclair, N.J.; William J. Harris, Farrel-Birmingham Company, Inc., Ansonia, Conn.; Fisher Hills,

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Dewey and Almy Chemical Company, Brookline, Mass.; E. Stanley Johnson, Monsanto Chemical Company, Springfield, Mass.; R. Winslow Jones, Army Aviation, Dayton, Ohio; Almer Moore, Penn-Dixie Cement Corporation, Rockville Centre, N.Y.; Edward J. Murphy, RCA Communications, Inc., Crown Point, Ind.; Daniel J. O'Connell, Jr., Daniel O'Connell's Sons, contractors, Holyoke, Mass.; Richard K. Oppen, U.S. Rubber Products, Inc., Passaic, N.J.; Howard G. Pankratz, DeVilbiss Company, Toledo, Ohio; Harold C. Pease, R. Guastavino Company, Winchester, Mass.; Carl M. F. Peterson, Mechanical Engineering Department, M.I.T., Woburn, Mass.; M. Edgar Powley, Socony-Vacuum, Wellesley, Mass.; John P. Rich, Jr., Improved Paper Machinery Corporation, Nashua, N.H.; Myron W. Ryder, Cambridge Gas Light Company, Belmont, Mass.; Arthur K. Scott, Standard Oil Development, Westfield, N.J.; Adam K. Stricker, Jr., General Motors Corporation, New York City; Warren W. Walker, Weston Electric Instrument Corporation, Montclair, N.J.; Carl G. Wennberg, Special Tool and Machine Company, Milton, Mass.; Norman M. Wickstrand, New Departure Division of General Motors Corporation, Bristol, Conn.; Clarence E. Worthen, Jr., Canada Dry Ginger Ale, Inc., Hudson, N.Y.; and William W. Young, Jr., industrial heating engineer, Watertown, Conn.

Some of the same group and some new faces appeared at the Alumni Day Dinner on June 5: Theodore Malmstrom, United States Engineer Office, Cranston, R.I.; Putnam Cilley, Tileston and Hollingsworth Company, East Milton, Mass.; Edwin R. Gardner, General Electric Company, Lynn, Mass.; William E. Higbee, Dennison Manufacturing Company, Framingham, Mass.; Jacob G. Mark, Dewey and Almy Chemical Company, Cambridge, Mass.; Howard G. Pankratz, DeVilbiss Company, Toledo, Ohio; Sears L. Hallett, Sherman Paper Products Corporation, Brookline, Mass.; Leonard C. Peskin, American Steel and Wire Company, Worcester, Mass.; Harold C. Pease, R. Guastavino Company, Winchester, Mass.; John P. Rich, Jr., Improved Paper Machinery Corporation, Nashua, N.H.; Ernest Kohler, Ken-Rad Tube and Lamp Corporation, Chicago, Ill.; and William J. Harris, Farrel-Birmingham Company, Inc., Ansonia, Conn. Your Secretary, like most of the others, had to be content with the week end and cannot vouch for the group at the Alumni Day Dinner, but to say that the gang at Saybrook had a good time would be putting it mildly indeed. Except for the rain on Sunday which spoiled golf and forced us to eat our shore dinner indoors, we could not have enjoyed more our stay on Long Island Sound. Most everybody turned out for golf either Saturday morning or afternoon or both at the Old Lyme Country Club. There were no prizes, but if my memory serves me correctly, the golfing honors were shared by your Secretary and Eric Bianchi with 70 and 72, respectively, against a par of 66. While the course was

short, as the par indicates, it was very interesting, with an old cemetery for a hazard on one hole and a par-three hole whose green lay sunken between two parallel rock ledges that ran at right angles to the line of flight from the tee. Further, the ledge in front of the green was about 150 yards out from the tee and about 75 feet higher than the tee in elevation. Enough of the golf; no doubt more of you would be interested in the personal items concerning those present.

The big surprises were Bill Aldrich and Bill Young, both of whom were so willowy in 1929 and who now tip the beam at over 200 pounds. Dick Coveney and Carl Wennberg do not exceed the 200 mark so much as the two taller classmates, but neither of them seems to have starved through these last ten years. Next on the scales were probably Russell Clark and Carl Peterson. While discussing avoidpous we should mention that two of our gang showed up on the minus side of what we knew back in 1929, namely, Cub Clark and Hugh Hamilton, the old Technology Christian, who, incidentally, pulled the boys up short at Sunday dinner with a serious lecture on the liquor question while they all had glasses in hand. So did Hugh, but that did not become apparent until he sat down and the farce was exposed.

Most of the rest looked about the same as when we left Tech, with Norman Wickstrand the most bald. He had a pretty good start back in 1929. Your Secretary, probably ranks second. Wally Gale and Bill Aldrich drove together from South Bend, Ind., where Bill stopped off on his way from Montana. George Burgess drove in from Cincinnati about three o'clock on Saturday morning. Unfortunately, everyone in the inn had gone to bed and was sleeping so soundly that he could not wake even the watchman. Consequently, he joined us the next morning after sleeping in town.

Many were the promises to keep these columns informed, but so far no one has written. How about some of the rest of you forwarding a note now and then? Let us know what interfered with your plans to attend the reunion and what sort of plans you would like to see worked up for our fifteen- and twenty-year reunions. Did our ten-year reunion plans suit you? Those of us who attended had a fine time, and our committee deserves a lot of credit for the good work they did organizing the affair for us. Thank them by sending suggestions for the next reunion. — EARL W. GLEN, *General Secretary*, Box 178, Fairlawn, Ohio.

## 1930

Our news this month has a definite marital trend to it, with two engagements, four weddings, and two more class babies. Ted Riehl, X, is engaged to marry Miss Margaret Walker Wade of the Bronx, N.Y., and Tul Houston, XVII, is soon to take as his bride Miss Christine Plum of Ventnor, N.J. — Married last March was Miss Margaret Surre, IV, to Donald Newton Wilber of Princeton, N.J. Immediately after the wedding, Mr.

and Mrs. Wilber sailed for Europe to join an archeological expedition in Iran. Another architect in the news was Fred Garvin, who married Miss Margaret Porter Murphy of Charlestown, Mass., in June. Our one-time track captain, Freddy Ladd, II, likewise joined the benedicts in June. His bride was Miss Margery Barbara Kilbourn of Groton, Mass.

Three VI-A men are responsible for our other news items. Two years ago Earl Ferguson became the proud dad of a baby girl, but the VI-A *News* didn't find out about it until last June. Late in May, Miss Marjorie Smith of Brookline, Mass., became the wife of Ed Prendergast. The Irving Dows announced the birth of Letitia Adair Dow in July.

And now, please jot down the dates June 1 and 2 as the time of our ten-year reunion, which precedes Alumni Day, 1940! Plan to fit both of these occasions into your budgets when you start the New Year. We'll see you there. — PARKER H. STARRATT, *General Secretary*, 75 Fenno Street, Wollaston, Mass.

## 1934

Another milestone in our class history was reached last June 3. We paused momentarily to crown it with a wreath of success and then passed on our way rejoicing. To those of you who may not remember that far back or who were so unfortunate as to have been unable to attend, that date marked the beginning of our fifth annual reunion. From near and far, the boys trooped to the Mayflower Hotel at Plymouth. For two solid days we were removed from the troubles of everyday business and thoroughly enjoyed the sunshine of good cheer that exists when good fellows get together. Some of the boys arrived as early as Friday afternoon and tried out the golf course and other amusement facilities around the hotel. However, the majority arrived before noon, Saturday, in time for lunch, and everyone had plenty of things to talk over with old friends.

After lunch the golf tournament was started and carried over to the following day. A few of the more courageous got into their swim togs and dashed in and out of the foaming brine. The water was too cold to allow any prolonged bathing, however, so that form of entertainment was not very popular. An impromptu softball game was started by some of the boys in preparation for the match the next day. Tennis had been scheduled, but the court was in such poor condition, this had to be called off. As Jim Eder, tennis chairman, expressed it: "The ball burrowed into the sand every time you served."

Free beer was one of the attractions that proved very popular until it finally gave out during the wee hours Sunday morning. It sufficed to moisten parched palates after rounds of golf and revive waning spirits. Around eight o'clock Saturday night we collected enough of the boys to start the banquet, and the rest wandered in when they got hungry. After dinner there was a storytelling con-



test with prizes offered for the best yarn. One story led to another, and they got better and better as the boys warmed up. By popular acclaim, Al Rogowski was proclaimed Aesop, with close runners-up in Miller, Eder, Stein, Emery, and Esslinger.

Another source of entertainment was put on by Beshara Battit, who selected a number of boys to give a play with only fifteen minutes' rehearsal. The lines were read out of the books but even so the acting was well done and the actors all got a big hand. Phil Kron had brought a movie projector with him and showed some football pictures and an ancient Laurel and Hardy comedy. The attempts at humor by the comedians and also the naïveté of the acting were funny through their crudeness and were well appreciated. After the movies everyone gathered around the piano and until the early hours of the morning sang all the old stand-bys and a few new additions.

Breakfast on Sunday was eaten individually when and if the boys got up. The golf tournament was continued, and a softball game was started between the married men and the bachelors. Before it could be completed, the rain began, and the game was called off. However, the married men were in the lead and were proclaimed the victors. The rain also made it impossible to hold a boat race in two surfboats, which was to have been sponsored by John Newbegin. Since the tennis tournament, as such, could not be run, an improvised game of hand tennis was held on the porch, with the court marked out in chalk.

The noon meal was a real New England shore dinner with all the trimmings. It was the last official meal of the reunion, and at its completion the various prizes were distributed. Two engraved silver plates were presented to the winners of the golf tournament and the "tennis" tournament. The golf was won by Charlie Sheehan, with Hal Reynolds as a close second. The tennis was won by Al D'Arcey who nosed out Bill Timmerman in the finals. These silver plates will have the names of the winners inscribed on them and will have to be won at three different reunions to be kept permanently. Each member of the winning ball team was given a miniature bat with a cardinal and gray ribbon attached.

Everyone was of the opinion that the reunion was a grand success, and a unanimous vote was cast for another one five years hence. For the success of the affair we owe a great many thanks to the committee which did the hard work of planning and arranging all the details, getting the materials together, and seeing that everything went off smoothly. This committee consisted of Mal Stevens, Beshara Battit, Bob Roulston, and Ken Ryder of the Greater Boston area; Jim Eder in the New York territory; and Phil Kron in Rochester. Give the boys a big hand, for they did a swell job.

In the column for news from here and there we hear that Earl Dobbins, who has been teaching engineering at Robert College, Istanbul, Turkey, for the past

three years, has returned to this country to accept a research assistantship at Technology. — Ben Malin is now a section chief of the air-conditioning and ventilating department of the Bureau of Agriculture in Washington. — Edward Pierce, Jr., is employed by S. Morgan Smith Company in York, Pa., manufacturers of hydraulic turbines. On April 27 Edward Everett Pierce, 3d, was born. Our sincerest congratulations!

Our gossip column has a few high lights that are noteworthy. The wedding of Bob Grosjean to Miss Emlen K. Davies, whose engagement was announced last January, took place on May 27 at Havre de Grace, Md. Bob's brother Charles acted as best man. Since the bride's father, the United States ambassador to Belgium, was unable to attend the wedding to give his daughter away, her brother-in-law, Senator Millard E. Tydings, performed this part of the ritual. Mr. and Mrs. Grosjean sailed for London on June 8 and planned to take a trip around the world this fall.

Mr. and Mrs. Miles Van Valzah Hayes will be at home in Woodstock, Vt., after completing a two months' honeymoon. Mrs. Hayes was the former Elizabeth Clement Field of Rutland. Plans for an October wedding were made by Doris Gilbert of Chestnut Hill, Mass., and John Hitchcock. Doris is the daughter of Mr. and Mrs. Royce W. Gilbert. Another Brookline engagement is that of Elise M. Thomas, daughter of Mr. and Mrs. Charles F. Thomas, to Walter R. Hede- man, Jr. No date has been set for the wedding.

On June 25 Daniel Smith was married to Miss Matilda S. Rosenfeld of Roxbury. The bride is the daughter of Mr. and Mrs. William Rosenfeld of Roxbury.

On June 17, John G. Brunner married Miss Mary E. Fay, daughter of Mr. and Mrs. Augustin A. Fay of Roxbury. The couple took a wedding trip to Quebec. — That is all for now fellows, but this is the time to loosen up your pencils and scribble off that note to your poor struggling Secretary. It's lots easier to do it than to think about it. — JOHN G. CAL- LAN, JR., *General Secretary*, 184 Ames Street, Sharon, Mass. ROBERT C. BECKER, *Assistant Secretary*, 169-49 24th Street, Flushing, Long Island, N.Y.

### 1935

The first item of news is Alumni Day of last June. I wasn't able to get up there myself, but Dick Lawrence was good enough to give us an account of what took place. Here is what he had to say: "At the University Club last night we had a much smaller gang than in 1938. Where all the Course II men were, I have no idea. Bernie Nelson was here from Buffalo, where he is still with the Bell system. Ed Woll seemed to be the only member of Course II who was there. Stocky was the Course V representative. Jack Burton, VI, tried to sell a few General Motors' Diesels. He is now with K. B. Noble Company in Providence selling Diesel power plants. Phil Rhodes, VII, Charles W. Smith, X, Jack Colby, XV,

Walter Daley, XV, and myself finish up the list. I did not attend the dinner at the Starler but understand that Paul Daley was on from Chicago. I forgot to mention that a couple of would-be engineers who are with the Edison Company and who are members of the Class of '36, namely, Bob Hannam and Web Wilson, attended the meeting at the University Club, as did Dave Greenlie, VII. The discussion of the fifth reunion seemed to me to be quite successful. There are two schools of thought on this: One is in favor of having it near Boston, say Manomet or the North Shore; the second is to have it about half-way between here and New York, in Connecticut somewhere. We decided that both these ideas should be put in The Review so that opinions could be given by members not present. As far as those present were concerned, they were all planning to come, no matter where it is. The reason behind the Connecticut plan is that it will probably draw a great many fellows from New York City and New Jersey who might not attend if they had to come all the way to Boston. We also believe that plans should be pretty well set by the first of the year. As for the Course XV convocation which took place on Sunday, June 4, the Class of '35 really had a turnout. What happened to them all after Sunday I have no idea. We had a greater number there than at the University Club.

"In all there were sixteen of us: Earle Megathlin, Bob Forster, Walter Daley, Vincent Sorrentino, Larry Stone, Lars Anderson, Ellis Flink, Dick Hughes, Jack Colby, John Best, Jack Taft, Gregg Fry, Bart Chapman, Gordon Scowcroft, and Fred Borrowdale, a graduate student in '35. John Best is with the Permutit Company. Dick Hughes is with the American Hardware Corporation in New Britain, Conn. Walter Daley was to be married some time this fall. Bart Chapman was to be married in October. At a previous meeting held for Course XV to discuss the convocation we saw Sleepy Banquer, Dick Shaw, and Elmer Roth, besides a great many of those who attended Sunday. From all the opinions gathered about next year, everybody I talked with is coming and knows plenty of others who will be there. It looks like a push over."

From time to time, both in The Review and by direct mail, you will receive notices and information regarding this fifth-year reunion. Many of you will remember the class survey of a year ago. It may be that we will have another one this year, in which case we will kill two birds with one stone by handling the survey and reunion information at the same time. In the meantime, I would appreciate very much having your suggestions as to where we should hold the reunion and what we should do.

Now we get down to our usual list of marriages, and so on. Harold Farr and Naunerle Calhoun were married on May 19 in Houston, Texas. Harold has been working for Schlumberger Well Surveying Corporation on oil prospecting. He has been a party chief on electric well

1935 Continued

logging and well perforating. — Al Mowatt and Marion Hubbell were married on July 22 in Verona, N.J. As you will recall, Al was with the West India Chemical, Ltd., in the Bahamas for quite some time. For the past year, he has been with the W. H. Coburn and Company as a statistician on market analysis and sales. Another example of a perfectly good chemist gone haywire. — Bill Buechner and Mary Christina MacLeod trod the middle aisle on June 20. Bill has been doing high-voltage research back at the Institute. He is getting to be a regular supercharged physicist. — George Hunt was permanently hooked by Beth Moore on July 1. George has been working in the development laboratory of the United States Rubber Company in Naugatuck, Conn. — Prescott Smith now has a better half whose former name was Eloise Melville. Pres has been working for Pratt and Whitney in Hartford, Conn., as a production engineer on methods and problems. — Shortly after this issue of *The Review* reaches you, Henry Kimball will swallow the hook, line, and sinker dangling from the rod of Ellenor Banks of Lynn, Mass. Hank has been working as a design engineer for United Shoe Machinery Corporation. He reports that his extracurricular activities have been confined to golf this summer because he finds that preparations for the big event are time consuming. Jim Parker, Jack Hossfeld, and Jerry Rich will be on hand to see that Henry gets well started on the ship of matrimony. — Some time ago we reported the engagement of Jim Libby and Helen Crossman. They were hitched on June 3 and are living in Wilmington, Del.

The following miscellaneous items were picked up from here and there: Otto Zwanzig, who has been working for Public Service Electric and Gas Company for several years, is now taking some courses in New York University Graduate School of Business Administration. I guess Otto wants to learn the technique of jamming his foot in the doorway when he is out selling for the Electric Company. Dan Clapp is an instructor in chemistry at Williams College. His headquarters are at the Thompson Chemical Laboratories. Charles Hanley, in addition to his design work for Gibbs and Cox, will teach night school at Cooper Union. His appointment was announced by Edwin S. Burdell '20, director of the union, formerly Dean of Humanities at M.I.T.

When our survey was issued some time ago, Bill Gilbert was reported as unemployed. That was an oversight, since he has been working for the St. Lawrence Oil and Supply Company, Ltd., of Gananoque, Ontario, since 1936. About a month ago, I was surprised to receive a reply to the survey questionnaire from Tzeng Jiueq Suen who is at the Chungking University in Chungking, China. This reply reached me just about one year after the questionnaire was sent out. I wonder if the war in China had anything to do with this delay. Edward Barber has been transferred by the Coast Artillery Corps to the Army's Command

and General Staff School at Fort Leavenworth, Kansas. Robert Lindenmeyr is now working for American Heat Reclaiming Corporation. Jack Ryan has joined Super Steels, Inc., in Chicago, Ill. The new address for Holbrook Smith is Holbrook Smith and Company, 10 East Front Street, Red Bank, N.J. Walt McKean now hangs his hat at the Raritan Copper Works in Perth Amboy, N.J. Perth Amboy is almost as bad as Staten Island where your humble reporter is stuck for the moment. Randy Antonsen has finished his studies at M.I.T. and is now in Brooklyn, N.Y. Oscar Browne, Jr., has been transferred by the bureau of construction and repair of the Navy Department to Washington, D.C.

I received two notices of changes of address as of the same date. When reported together, they are rather interesting: Boyd Brownell moved out of 308 South Kensington Avenue, La Grange, Ill., and Jack Anderson moved into the same address. We wonder if Jack was the police officer who ejected Boyd from his happy home. John Cheney is now employed by the D. C. Glassie Company in Washington, D.C. Raymond Coombs has been transferred to the Command and General Staff School at Fort Leavenworth, Kansas. Damon Francisco has been transferred by Carbide and Carbon Chemical Corporation to New York City. Mrs. Erwin Kruegel, the former Alice La Bonte, now has the address of Ordnance Department, Watertown Arsenal, Watertown, Mass. Dwight Merrill has joined Evaporated Metal Films Corporation of Ithaca, N.Y. Malcolm Porter has changed his address for the *n*th time. He has been transferred to Denver, Colo., by the du Pont Company. Ed Prohaska has a new job with the Chambon Corporation, Garfield, N.J. Orson Randell has been transferred to Rochester, N.Y., by the Gates Rubber Company. Darrell Root has a new job with the Permutit Company in New York City. John Thorpe is now working in Durham, N.C., for the American Telephone and Telegraph Company. Jorge Villa has left the beautiful state of Massachusetts for his home in Bogota, Colombia, S.A.

Again, I would like to ask you to send in your suggestions for our fifth-year reunion, which takes place next June. Be sure to note the change of address of your Secretary to Wellesley, Mass. — ROBERT J. GRANBERG, *General Secretary*, in care of W. C. Voss, 9 Old Town Road, Wellesley Farms, Mass. RICHARD LAWRENCE, *Assistant Secretary*, 111 Waban Hill Road North, Chestnut Hill, Mass.

### 1936

To start a new volume of the class notes, I have a bit of news that is especially interesting to me. This will probably help to explain why the news has been a bit meager lately; I just haven't written as many letters as I ought. Some of the Class might say that writing about so many weddings for this column finally had its expected effect. At any rate, on July 1 my marriage to the former Miss Marian Darby of Buffalo took place. The

ceremony was performed at the home of the bride, and after the reception we left for Toronto. We motored to Montreal and Quebec, and took a boat trip up the Saguenay River. Then we went through Maine to Boston and from there returned to Buffalo, where we have an apartment at 109 Shepard Avenue in the suburb of Kenmore. We should like to see any members of the Class who happen to be coming through Buffalo and could even arrange to put them up overnight. I am still in research work at the laboratory of the Linde Air Products Company in Tonawanda. Other members of the Class working at the same place are John Hamilton, who was transferred from the Union Carbide and Carbon laboratory in Niagara Falls; Jim Patterson, who has been here since graduation; and Jim Craig, who was transferred from the Newark Linde laboratory. Craig reports having seen our Prexy, J. C. Austin, who also is working for Union Carbide and Carbon, of which Linde is a subsidiary. Jim Patterson was also married this past summer — on August 12 — and he, too, has now settled down in a small apartment. His bride was Miss Marian Goodwin of Utica. Jim Craig became the proud father of a seven-pound three-ounce boy, Richard Thomas, on September 5. As yet there is no matrimonial news from John Hamilton, the remaining member of our gang here.

The past summer has been a very good one with the members of the Class, if the number of marriages can be taken as an indication. June 5 was the date of the wedding of Miss Dorothy Allin and Malcolm Blanchard, III. Blanchard met his bride at the College of the Pacific, which they both attended. The couple drove east from Stockton, Calif., where the wedding was held, through Canada, to Bath, Maine. — Robert Van Patten-Steiger, V, was married on July 22 to Miss Margaret Hodges, a former student at Skidmore and a graduate of the Katharine Gibbs School. — Another recent marriage of a '36 man to a Skidmore graduate was that of Frank Phillips, VI-A, to the former Miss Deborah Beede on May 20. The bride was a 1938 Skidmore graduate. The Class was represented among the ushers in the person of Bill Prichard. The newlyweds are living at "Lindcrest," 713 Academy Terrace, Linden, N.J., which is handy to Frank's work in Elizabeth with the New Jersey Bell Telephone Company where he has recently been promoted to assistant commercial manager. — Henry Wilsey, VI-C, was married on June 24 to Miss Janet Patrick of Upper Montclair. Henry is with Underwriters' Laboratories, New York. — June 24 was also the wedding day of Randal Robertson, VIII, and Florence Dunbar. The ceremony took place in the chapel of Mount Holyoke College, where the bride was graduated in 1936. After leaving M.I.T., Robertson was a research assistant in the physics department at Columbia University. He is now in the research laboratories of the Norton Company, Worcester, Mass. — The wedding of Marshall Holcombe, IX, and



1936 Continued

Miss Vivian Swain, Wellesley College '37, occurred on June 17. Among the ushers were Bill Bates, Al Busch, Bob Haynes, Fritz Neagle, Phil Ober, Bill Pattison, Ed Snow, and George Wemple '37. Dave Varner was best man. The Holcombes are living at 2124 Eye Street, N.W., Washington, D.C., where Marshall is working in the United States Patent Office. — A wedding trip to Central America was enjoyed by Bob Wead, XIII, and his bride, the former Miss Mary Jane Clark of Manhattan, Kansas. — George Crummey's wedding to Miss Grace Cooke, a hometown girl from Meriden, Conn., took place on May 6. — Another Course XV wedding was that of Webster Wilson and Miss Marguerite Brandt on June 10. The newlyweds spent their wedding trip in Canada. — The final wedding we report is that of Charlie Endweiss, XVI, who married Miss Shirley Heck of New York in July. Charlie is now in San Diego, Calif., where he is stationed with the second Marine Aircraft group.

It wouldn't seem possible that there still were unmarried members of the Class after the long lists of marriages that have been printed lately. Some of the boys are still getting engaged, however, and a few announced during the summer were those of Donald McMullin, IV, and Miss Jean Gwyer of Simmons and Antioch Colleges; Bill Garth, XV, and Miss Sarah Curtis of Wellesley College; Bill Benson, XVI, and Miss Virginia Brooks of Stanford University; and Charlie Betts, XVII, and Miss Margaret Beal of Mount Holyoke College. Bill Benson, by the way, is flight research engineer with El Segundo division of the Douglas Aircraft Company in California. He received his master's degree from Stanford in 1938.

There is some news besides weddings and engagements in spite of the fact that I have not heard from any of the course correspondents. Wallie Mathesius, III, will have his name preserved for posterity as coinventor of patents 2,155,349, and 2,155,350 on alloy steels. According to our files, Wallie is with the National Tube Company, McKeesport, Pa. — Henry Herpers, V, is with the Field Museum of Natural History in Chicago. — The Battelle Memorial Institute in Columbus, Ohio, has secured the services of Arthur Bearse, V. — Another of the Course VI men with General Electric in Schenectady is Paul Lebenbaum, Jr. — Al Dasburg, VI-C, is now working for the General Railway Signal Company in Rochester. — Ken Rees, VI-A, who received his bachelor of science degree from Northeastern University, has been awarded a half-time graduate assistantship at Armour Institute of Technology, where he will conduct industrial research in high-temperature heat-transfer problems, working toward a master of science degree. The appointment is one of three graduate assistantships awarded by Armour's research foundation in connection with its expansion program which contemplates the establishment of new laboratories for acoustics and vibrations, x-ray, spectroscopy, and other subjects. The following items are quoted from

the VI-A News: "O. B. Falls was elected president of the Berkshire Technology Club last May 9. Mr. Falls is employed in the control station department of G. E. at Pittsfield. . . . Walt MacAdam is still moving around the country for the American Telephone and Telegraph Company, learning the wires. . . . Ray Woodrow, a fellow employee of Ed Halfmann at Philadelphia Electric Company, was the proud father of a boy, born January 15. . . . A letter from East Hartford, Connecticut, informs us that Boris Maximoff is working with the Hamilton Standard Propeller Company. . . . Visitors to General Electric's House of Magic exhibit at the New York World's Fair should look for Bob Williams. Bob is on duty there now, and welcomes all VI-A alumni and undergraduates. Incidentally, he claims that the House of Magic in Steinmetz Hall is a good show, even for those hardened souls who have worked in high voltage labs."

Continuing our news from other Courses, we find that Boynton Beckwith, IX, is now with the Boeing School of Aeronautics in Oakland, Calif. — Geoffrey Broughton, X, has been transferred by the Kodak Company to Harrow, England. — Carnegie-Illinois Steel has sent Andre Brisse, X-B, to another steel city, Gary, Ind. — Another steel man is Herb Potter, XV, who is with the Carpenter Steel Company of Indianapolis. — Gulf Refining Company, South Bend, Ind., has Ralph Van Sant, XV, among its employees. — Joel Bulkley, XV, is now in Providence, R.I., with the Old Colony Co-operative Bank. — The comptroller's department of the United States Rubber Company in New York City claims Fred Hinton, XV. — Anthony Mustoe, XVI, who is with the Air Corps, has been transferred from Selfridge Field in Michigan, to Langley Field in Virginia. — Bus Schliemann is now with Vought-Sikorsky in Stratford, Conn. — With the Bureau of Aeronautics of the Navy Department in Washington, D.C., is George Schliestett, XVI. — Al Showalter, XVI, is with the United States Weather Bureau, also in the nation's capital. — ANTON E. HITTL, *General Secretary*, 109 Shepard Avenue, Kenmore, N.Y. ROBERT E. SAWYER, *Assistant Secretary*, 55 Robinwood Avenue, Jamaica Plain, Mass.

#### 1938

Weddings and engagements have continued apace throughout the summer, so here goes: On June 24, Preston Heintz, II, was married to Miss Priscilla M. Brown of West Somerville, Mass. — July 15 saw Bill Camp, XV, married to Miss Priscilla Glazier in Greenfield, Mass. They plan to make their home in Manchester, N.H., where Bill is an industrial engineer for the International Shoe Company. — John Kinnear, XIX, was married on July 22, to Miss Helen Poor in the South Congregational Church, Peabody, Mass. John is now assistant smelter superintendent for the Nevada Consolidated Copper Corporation at Hurler, N.M. — We have been informed that Herb Wiley, II, was married in June to

Miss Edith M. Sanford of Lawrence, Mass., and they are now living in Cuyahoga Falls, Ohio. — From Vernon Lippitt come reports that Bob Landay, VI-C, was married to Miss Ruth Steiner of New York City and they are now settled in Brooklyn, where Bob is writing specifications for equipment orders for the Navy. Also, Johnny Craig, VI-A, was married in August, but no further details are available as yet. The last wedding of which we have record is that of Paul Black, VI-B, to Miss Ruth Corbett of Quincy, Mass., on September 16. Paul is working for the Miller Company in Meriden, Conn., where he and Ruth will make their home.

Fred Jenks, who is with the National Union Radio Corporation, Newark, N.J., is engaged to Miss Helen Purinton of Worcester, Mass., and Abbott Maeder to Miss Lauretta Bissonnette of Middleboro, Mass. (Note: If the Class keeps it up at this rate it will be easier to publish a list of those who have not yet fallen from the ranks of bachelorhood!)

Paul Des Jardins was kind enough to write last May, but his letter inadvertently missed the July issue. However, here's what our former track star writes of himself: "After graduation and a short vacation I started work with the Worthington Pump and Machinery Corporation at the main plant in Harrison, N.J. Since only two of us new men were taken on last year, we were shifted from division to division and given a free hand to find out all we could about the organization and products in any way that we saw fit. We poked our noses into everything and talked with just about everybody. The most revealing thing to me was that everybody went out of their way to help us, and they really gave us the dope that we were after. They were able to do this very efficiently because they assumed that first, we were fresh from some engineering college, and that second, we didn't know a . . . thing about engineering. A break came in the fall when a shuffling of personnel left an opening in our Pittsburgh office. The job was offered to me, and I jumped at the chance. Before taking over the job of estimator for the Pittsburgh district I was put through the ropes at our plants in Holyoke, Mass., and Buffalo, N.Y. Now I'm working away here in Pittsburgh." Paul also adds that Skip McGill is with Bucyrus-Erie in South Milwaukee, playing around with steam shovels and the like.

Now the latest news from our Rhodes scholar, Vernon Lippitt, who says: "You may be interested to hear that I am going to be moving west rather than east this fall. My hopes of going over to Oxford were shattered at about the moment Chamberlain announced over the radio that England and Germany were at war. A letter from the American Rhodes Secretary a few days later confirmed the belief that the scholarships would be suspended for the duration of the war. How long that will be is anybody's guess; so I started looking for a job. Having hoped to try teaching sometime, I applied at Northwestern University.

1938 Continued

They are starting a new technological institute there, and its dean is O. W. Eshbach, whom some of the VI-A men will remember from their co-operative work with the telephone company. Word came yesterday that my application had been acted on favorably, and that I was to receive a part-time instructorship in freshman mathematics. So I'll be taking up residence around Evanston, Ill., in the near future, just when I don't know as yet. If my teaching schedule allows, I hope to take some courses at the University of Chicago also.

"Russ Coile, VI-A, worked from February through June as a research assistant in the Electrical Engineering Department at the Institute and since then has been working for the Carnegie Institution, department of terrestrial magnetism, in Washington, D.C., preparatory to a three-year assignment at a station in the mountains of Peru. Fred Schmitt, X, has completed a year in the cadet course of the Consolidated Edison Company of New York. He lives at home in Long Island City."

From Aliquippa, Pa., comes the news that John Petroskas, XIX, is now steel works investigator for Jones and Laughlin, and that John Binke is now in Texas doing contact work for Bethlehem's seamless-tube division. Our still beloved, but seldom heard from, President, Jack Wallace, is now in the stress department (we refrain from comment) of the E. G. Budd Manufacturing Company in Philadelphia. Bob Robbins, however, is still with Pan American Airways and flies back and forth across the Atlantic as test engineer on the various clippers — quite a job, especially in times like these! Jay AuWerter, XVI, and Doug Esperson, X, have settled down to the comparative calm of apartment life in New York City. Jay is with the *Aviation* magazine and Doug is engineering means to pep up the manufacture of cosmetics.

Well, we've gathered enough news to get off to a whirlwind start this year; let's keep it up! We like to hear and to write about such things as the six weeks' cruise that Dick Young took in the schooner *Black Arrow* this summer (the lucky stiff). So when you get a chance, drop your Course Secretary or Class Secretary a line. We won't be insulted if it is only on a post card.

Your Secretaries are now going to turn this column over to our indefatigable Course X Secretary. — DALE F. MORGAN, *General Secretary*, 6 Avon Road, New Rochelle, N. Y. LLOYD BERGESON, *Assistant Secretary*, 885 Beacon Street, Newton Centre, Mass.

## COURSE X

My news of class activities extends back to last June, when I had my first real chance to exercise my status as an Alumnus by covering Alumni Day activities from the beginning to the very end. The day dawned bright and clear, and things began to happen early — registration and all that sort of thing. Right off the bat I wandered into one of the good old '38 (and it is good *old* '38, for even as I write

this the Class of '43 is at Freshman Camp!). Well, anyhow, there was Don Severance, VI-B, working on the committee. Don has temporarily forsaken the electrical world, you know, and is at the Institute assisting Registrar MacKinnon '13. Don's job takes him all around the Institute, in and out of nearly every room and office. After registration I hurried to attend our conference on national defense, but apparently we are a conservative Class, untroubled by the military outlook and strong for isolation — there wasn't another member of the Class present unless he was hiding in the front row!

Leaving the search for '38 I had lunch with Oz Stewart and his parents; Oz is a true chip off the old block, and his father is an Alumnus of '11. Together we gave our approval to the class day exercises, and then I settled down to this serious business of getting things dedicated! First on the program was the new Briggs Field House, the fruit of the Alumni Fund Campaign our Class remembers so well as its first opportunity to show appreciation to the Institute for all that we received there. And, say, make a note on your calendar to come back to Alumni Day next June just to inspect the new field house! Oscar Hedlund is walking around with his head so high in the air he'd be able to squint right over the top of Bill Greene's head. Among the crowd "assisting" in the dedication of the field house I spotted Mert Barrows, IV, and Dave Beaman, Jr., II-A, inspecting with amazement. I left them, however, in order not to miss the second dedication: the Dard Hunter Paper Museum.

Maybe it was just my two months' insight into the paper industry that comes from the Chemical Engineering Practice School, but I had no trouble at all spending three-quarters of an hour wandering from early Egyptian papyrus to the first Chinese printing, pushing buttons on the scale models contributed by the Hobby Shop, and peering at strange, elaborate watermarks. (You can give your wife or fiancée a box of the best writing paper watermarked with her portrait for only \$2,000!)

By now it was getting along toward banquet time, so I just had time to take a glance at the army and navy exhibits in the Great Court. (Bursar Rhind and I took turns staring through a real submarine periscope trained on the Esplanade across the basin, but there's nothing interesting to report.)

Once I had reached the Statler for the banquet, the Class began to appear in greater numbers, which may be taken to prove something or other! The first person I saw was Dick Vincens — at the bar, of all places! We wandered upstairs into the ballroom in time for the activity, however, and found our class table also seating Eben O'Brien, X, and Frank Atwater, XV. Mert Barrows escaped our search, and Don Severance was here, there, and everywhere all evening long. I won't attempt a description of the banquet, other than to say it was swell. And the only point worth commenting upon is to mention that '38 ran true to form:

There were more bottles of beer on, under, and about our table than could be seen for yards and yards! *There's* Alumni Day, as seen through the eyes of '38. In counting our attendance, I was able to get off the fingers of the first hand, but we can't exactly be accused of monopolizing the occasion.

The rest of June became a very quiet time for me, as I worked on a thesis, so I didn't meet a soul until I got home in Rochester to spend the summer with Eastman Kodak. Don Weir, IX, is with Eastman, and he's become a photographic enthusiast of the first water! I saw him at one of the baseball games, busily taking picture after picture. And then the next news I heard of Don was that he'd left for Hollywood. The rumors I've heard may be just catty, but I understand it wasn't a screen test that enticed Don out into the great West, but that he's going to be with Eastman in the movie capital. At present, he expects to be there for at least three years.

Also in Rochester I heard rumors about Dan Suter, XV. I think I've established with fair certainty that he's engaged, but up until the present time I haven't been able to discover the name of the party of the first part. I spent my summer working (but not hard) in one of the engineering departments of Kodak, and now I'm back at Tech, feeling like a perennial. My present plans are to stick my neck way out and see if I can get my doctor's degree in chemical engineering; so I have every prospect of being here for two years more!

No sooner did I arrive at school than I met Andy Dufourd, VI-A, who is also doing a little worrying about a thesis. Andy is nearly ready to hand his in, however; to make doubly sure that he keeps out of mischief he's spending his evenings taking the A Course at General Electric. (The A Course, I found out, is an advanced course for G. E. engineers.)

No mention of the present activities of '38 would be complete without a word about my roommate here in the Graduate House — Jimmy Gilliss. Jim has just completed a summer abroad with the Thorne-Loomis trip, and I've no doubt Bergy should have a first-hand account of that adventure ready for you in these columns soon. All I'll say now is that the Nazi *Gestapo* didn't get Jimmy! — Rumor comes around now and then to say that Bill Beye, II, is working for Curtiss-Wright, and that he's just been promoted to a job with Hamilton Propellers. — FREDERICK J. KOLB, JR., *Secretary*, The Graduate House, M.I.T., Cambridge, Mass.

## 1939

Continuing our notations from July, we have the pleasure of reporting on much romantic activity within the Class. Walt Brown led the VI-A men by marrying Miss Margaret Thomas on June 11; they are now making their home in Allston. Dick Kauffman, IX-A, married Miss Florence Hausman on May 28, the wedding being followed by a reception at the well-remembered Fox and Hounds



1939 Continued

Club. Miss Gay Hunt and Ben Badenoch, XVI, were married on June 24 in Newton and are now living in Burbank, Calif. The wedding was attended by many Delts and proved to be a very gay occasion. Also married during the latter part of June was Lawrie Fabens, II, who had an enjoyable two months' wedding trip abroad. Torchy is starting in at the Harvard Business School this fall. His bride is the former Alicia Hale of Wooster, Ohio. Bud Croshere, XVI, married Miss Madeline Merritt early in June, and they are now living in Santa Monica, Calif.

Not to be outdone by Course XVI, X proudly announces two engagements as follows: Irv Smith to Miss Helen Kaulback; and Don Broughton to Miss Phyllis Morrison of Brookline. The engagement of Byron Hunnicke, Jr., II, to Miss Priscilla Washburn of Brooklyn, N.Y., was announced on June 4. Another recently announced engagement is that of Walt Pulsifer, IV, to Miss Gertrude L. Douglas of Abington. Stuie Stearns, V, is engaged to Miss Phyllis Robb of Upper Montclair, N.J.

From the News Bureau at the Carnegie Institute of Technology, we learn that two graduates of M.I.T. have been awarded teaching assistantships at Carnegie for the coming year. They are Ezekiel F. Losco, teaching assistant in metallurgical engineering, and Lloyd Hunter, teaching assistant in physics. Both will continue their studies toward advanced degrees.

It is rumored that the Thorne-Loomis expedition returned intact after travels through countless European countries and that Don Waterman, II, has started work with the Singer Sewing Machine Company in St. Jean, Quebec. He plans eventually to return to the main plant in Bridgeport. Oz Stewart, also II, is now working for Farrel-Birmingham in Ansonia, Conn., and writes: "As you can guess, we had a marvelous trip, although it's particularly nice to be out of Yurup before we were thrown out."

Frank Spooner, X, has been appointed an instructor in the chemical engineering department at Cooper Union, it was announced by the director, Edwin S. Burdell '20, former Dean of Humanities at

M.I.T. Of Course IV, we learn that Art Douglass, Jr., is working as a designer for Steuben Glass, Inc., in New York, and that Tom Akin is with the Modular Service Association in Boston.

Among the Course XIX men, Ben DeSimone has been working for International Nickel of Canada; Shorty Merri-man, for the Scovill Brass Company in Waterbury, Conn.; and Louis Castleman, for the Sunbeam shavers in Indiana. Clint Hilliker and Mike Herasimchuk are taking the Bethlehem loop course, according to last reports. — Of Course X, we find Bob Harris in Buenos Aires and Jack Hamilton with the Aluminum Company of America. Win Reed is still enjoying himself with Socony Vacuum in New Jersey.

We'll be back in the December issue, but, in the meantime, if anyone feels the urge to send along news of himself or of his coursemates and classmates, hesitation can never satisfy The Review. — STUART PAIGE, *General Secretary*, Box 207, Greenwich, Conn. MORRIS E. NICHOLSON, *Assistant Secretary*, M.I.T. Graduate House, Cambridge, Mass.

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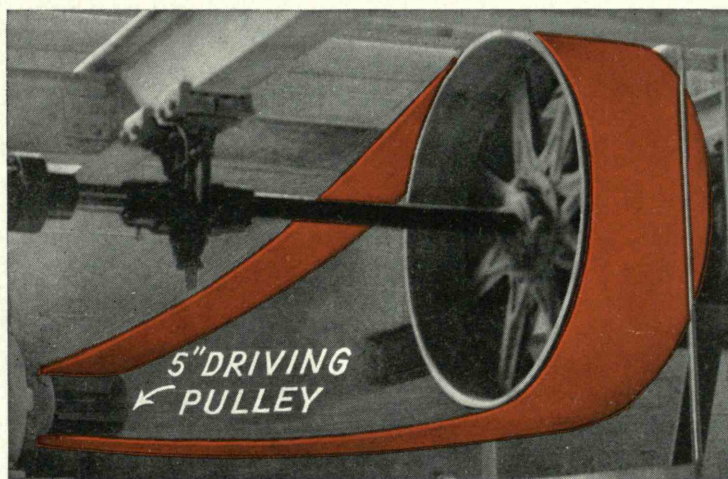
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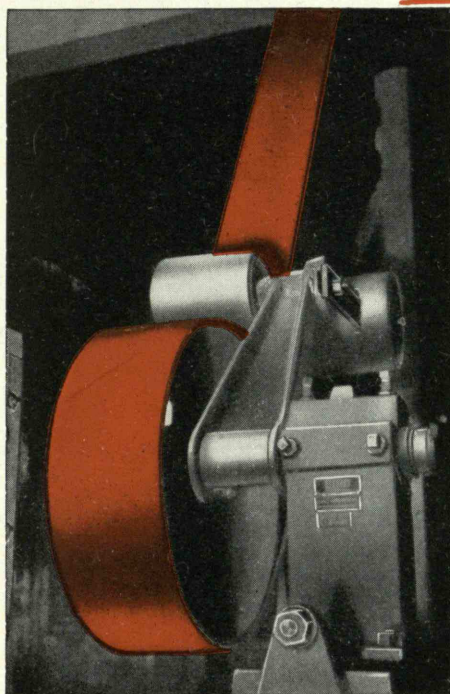
CAMBRIDGE, MASS.





# Condor Compensated Belt . .

PATENTED  
TRADE MARK REGISTERED



## The Belt With Equalized Ply Stresses Outearns Its Cost Twelve\* Ways

**E**ACH of the twelve\* advantages listed below is a money saver important enough to justify your putting a Condor Compensated Belt to work for you.

If you keep a belting ledger, your first installation will be the beginning of new and gratifying money-saving adventure in your plant.

Read over these twelve\* advantages and then follow through by writing for Bulletin 6808-C which illustrates and explains them more fully.

### \*12 ADVANTAGES

1. Ruptures in outside ply eliminated.
2. Freedom from ply separation.
3. Longer fastener life.
4. Can be operated on smaller pulleys.
5. Less bearing, shafting and hanger troubles.
6. For heavy loads, plies may be increased with same pulleys.
7. Operation less affected by atmospheric conditions.
8. Higher overload capacity or margin of safety.
9. Less wear on pulley side.
10. Can be dressed without injury to belt.
11. High production efficiency.
12. Material reduction in belting costs.

**Condor**  
PRODUCTS

Conveyor and Elevator Belt	Hydraulic Hose	Launder Lining
Transmission Belt	Oil and Gasoline Hose	Industrial Brake Blocks and Lining
V-Belt	Sand Blast Hose	Molded Rubber Goods
Air Hose	Steam Hose	Rubber Lined Tanks
Contractors Hose	Suction Hose	Rubber Covered Rolls
Fire Hose	Water Hose	Abrasive Wheels
	Chute Lining	Bowling Balls

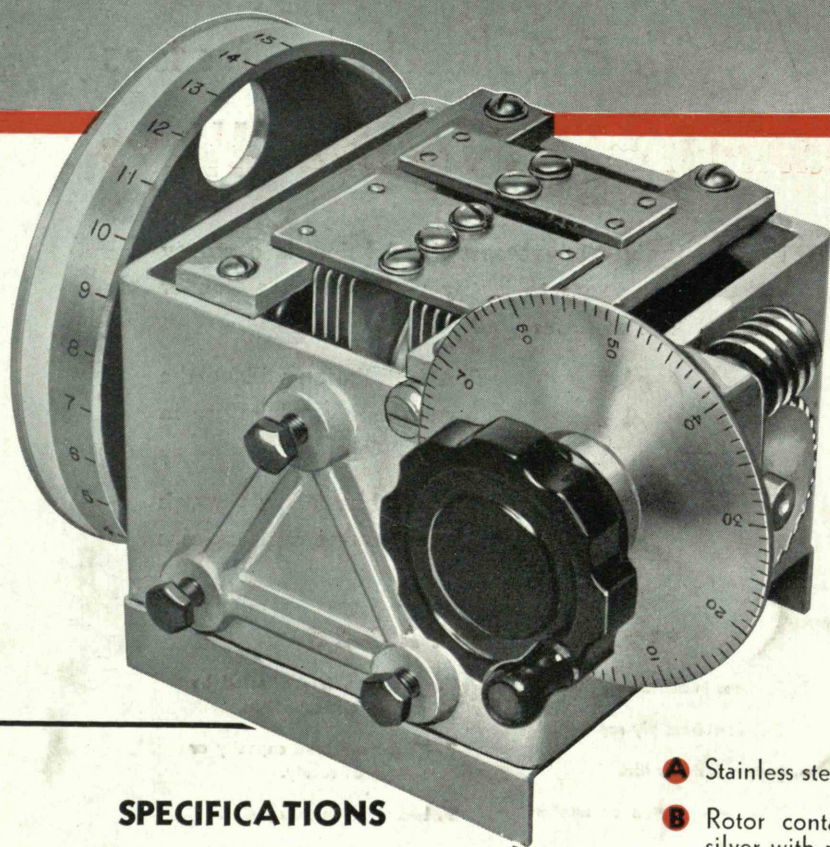


**THE MANHATTAN RUBBER MFG. DIVISION**  
OF RAYBESTOS-MANHATTAN, INC.  
EXECUTIVE OFFICES AND FACTORIES

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Direct capacitance 5  $\mu\text{f}$  minimum, 145  $\mu\text{f}$  maximum; shielding complete on 5 sides with terminals on unshielded side; insulation polystyrene and Mycalex; rotor and stator plates insulated from ground with rotor-to-frame capacitance of 7  $\mu\text{f}$  and stator-to-frame capacitance 6  $\mu\text{f}$ ; three-hole panel mounting; with "Acorn" tube and single-turn coil of copper ribbon  $3/4$  inch in diameter the frequency is 390 megacycles at minimum capacitance setting.

**F**OR use in high- and ultra-high frequency circuits the new G-R Type 755-A Condenser fills a demand for a compact, precision-built, ruggedly constructed variable condenser with low losses, very low series inductance and low effective resistance.

- A** Stainless steel rotor shaft
- B** Rotor contact ring of nickel silver with pure silver overlay; 4-finger silver contact brush
- C** Polystyrene rotor insulation; Mycalex stator insulation
- D** Heavy, copper-plated, soldered brass rotor and stators
- E** 30:1 precision worm drive with spring in indicator drum to prevent backlash
- F** Drum scale engraved with 15 divisions
- G** Removable paper scale for individual calibrations
- H** Removable base plate and cover of nickel-plated brass
- I** Ball bearings on main shaft
- J** Heavy cast-aluminum box; 3-point panel suspension
- K** Worm dial with 100 divisions on scale

**Type 755-A Condenser, \$35.00**

● WRITE FOR BULLETIN 472 FOR COMPLETE DATA